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Definite Linux

Version 7

Linux Distribution Comparison Chart

Supported features included as standard	Definite Linux 7.0 Advanced Server	Definite Linux 7.0 standard	RedHat Linux 6.0	SuSE Linux 6.2
Latest Kernel 2.2.12	Y	Y	N	N
Support for ISDN	Y	Y	N	Y
All applications are full products not demos	Y	Y	N	N
Hylafax Fax Server	Y	Y	N	Y
Xfree86 3.3.5	Y	Y	N	N
Netscape 4.6.1	Y	Y	N	Y
Star Office 5.1 for Business & Personal use	Y	Y	N	N
Enhanced support for CD writing	Y	Y	N	Y
CD-ROMs in JOLIET format (Windows®compatible)	Y	Y	N	N
Lightweight Directory Access Protocol (LDAP)	Y	Y	N	N
Password Authentication (PAM) for Apache & LDAP	Y	Y	N	N
Supports Cryptographic extensions in the Kernel	Y	Y	N	N
Enhanced raid support for DPT Smartraid V	Y	Y	N	N
OS & Applications Pentium Optimised at Compilation	Y	N	N	N
Includes Apache 128 Bit secure Internet server	Y	N	N	N

10 Reasons to choose the Official Definite Linux boxed set...

- ✓Developed for UK users
- ✓UK Technical Support
- ✓Includes StarOffice 5.1 for home & business use
- ✓100% Red Hat compatible
- ✓Includes free copy of Definite Linux Bookshelf (25 books 100,000+ pages)
- ✓Quick Reference Guide included
- ✓Boot Disk for easy installation
- ✓User friendly installation Guide
- ✓100s of the best, tested Linux applications
- ✓Full range of merchandise available

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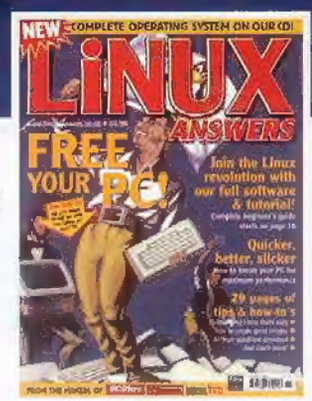

Welcome to Linux Answers!

Boy, have I learned some stuff about Linux recently. I've been so wrapped up in the world of Windows98 for so long, I'd forgotten what it was about computers that made me get into them in the first place. It was the sense of community, of mutual support and advice and, of course, the chance to hack some code.

Computing has become so big now that, in a sense, a lot of the above has become irrelevant. Computing these days is less about the enthusiasts who – lest we not forget – created the whole business, and more about the corporate market. So it's been fantastic to rediscover a community of computer enthusiasts, full of passion, missionary zeal and a real sense of adventure about Linux and why it's great.

> "You are now holding in your hands the UK's very first Linux magazine!"

Through Linux, I've rediscovered the sense that computing can be fun, subversive, pioneering, challenging, and empowering, and that it need not be about pandering to the slicing-and-dicing approach of modern marketing-driven corporations. Thanks to the Internet, seriously large numbers of like-minded people can now get together and actually challenge these corporations with better products, on their own turf.

There are interesting times ahead for Linux as it begins to grapple with the differing requirements of the corporate and desktop markets. I want to see Linux do well on the desktop, to give Windows a run for its money, and it's obviously going to have to become much easier to use. To do this, it will have to hide much of the stuff that makes it so attractive to coders, so it's been interesting to see Corel Linux (see page 14) and what it promises.

So why Linux Answers?

New magazines are always difficult to get right and a Linux magazine doubly so. Striking a balance between the needs of existing Linux fans and providing an easy way in for new users has been tricky. So I hope we've got the balance right. Even if we haven't, no matter – just write in and tell us what you think as there's plenty of scope to tweak things so it's exactly what you want in future.

We hope this issue is going to fly off the shelves and give us the ammo we need to do it on a more regular basis, so here's hoping. I'd like to thank all those people who helped put the mag together and gave their advice so freely. Cheers!

Nick Merritt
linux.editor@futurenet.co.uk

LiNUX ANSWERS

Our promises

- Our objective is to provide information and tutorials to all Linux users in as clear a manner as possible. This is the complete guide to Linux and its uses.
- We want you, our reader, to feel this is your magazine, so please write in with your views and opinions, article suggestions, reviews, tips and tutorials and we'll try to include them in any future issues. Contact us at **linux.answers@futurenet.co.uk**
- We fully support the aims of the Open Source movement
- Please note that Linux was developed under the umbrella of the GNU software project and, as such, its correct full name is GNU/Linux. However, within this magazine, for reasons of readability, we have used the shortened version, Linux. Find out more about GNU at **www.gnu.org**

Technical support

Please note that, due to certain constraints, we are unable to offer any technical support for our Cover CD or answer Linux-related technical queries. So please don't phone or email us. Instead, we strongly suggest you look in these places for advice:

- the forums on our Web site – visit it at **www.linuxanswers.co.uk**
- the **pcplus.linux** newsgroup
- the extensive collection of HOW-TO files on our CD
- the Red Hat Web site at **www.redhat.com**
- **www.linuxcare.com**

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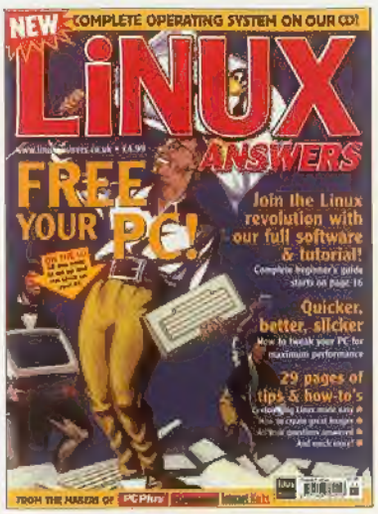
Première issue



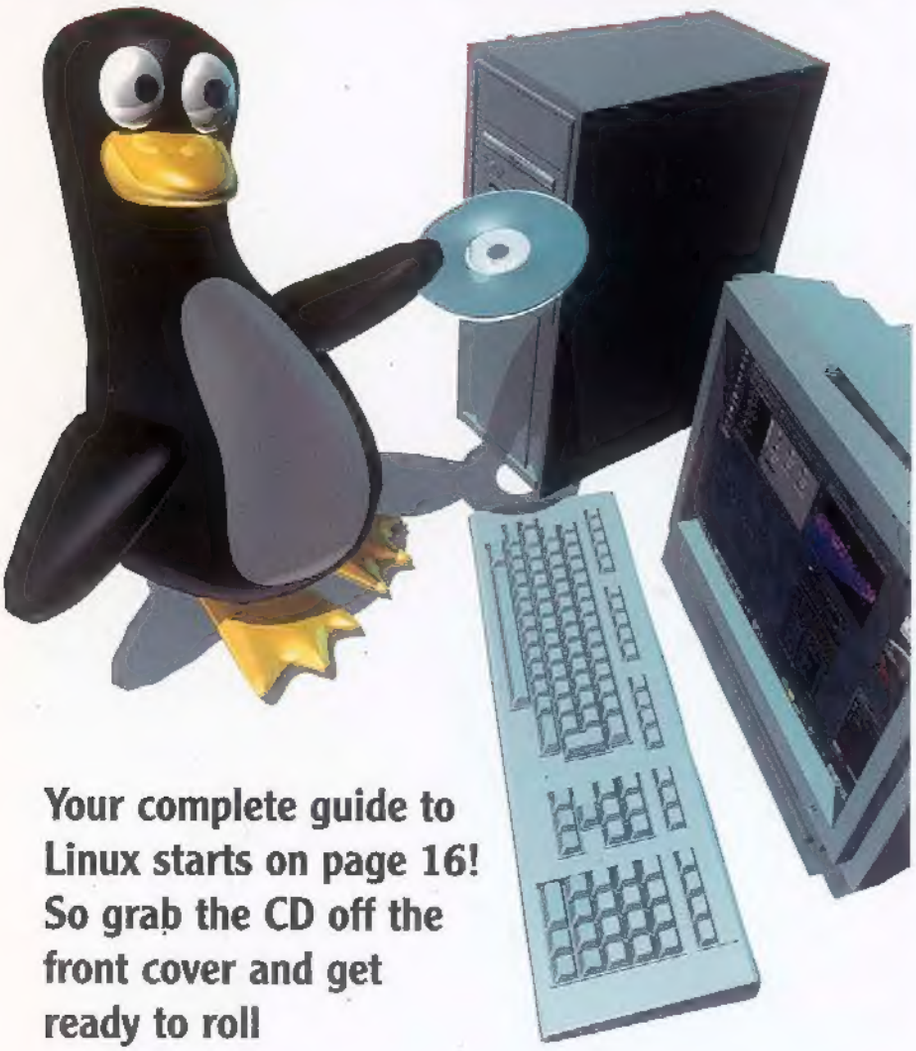
Working with Linux

How to get the most from Linux, quickly and easily!

Reviews

START HERE!

Install Linux right now alongside Windows! We explain how, step by step



Your complete guide to Linux starts on page 16! So grab the CD off the front cover and get ready to roll!

In this issue

Join the Linux community with our round-up of UK user groups on page 10

Your CD

Get started with Linux – everything you need is on our CD!
Includes the world's leading Linux distribution Red Hat 6.0, Corel WordPerfect 8, the wonderful GIMP image editor, KDE, 10 essential Linux tools and utilities, the complete Linux HOW-TO help archive and much more!

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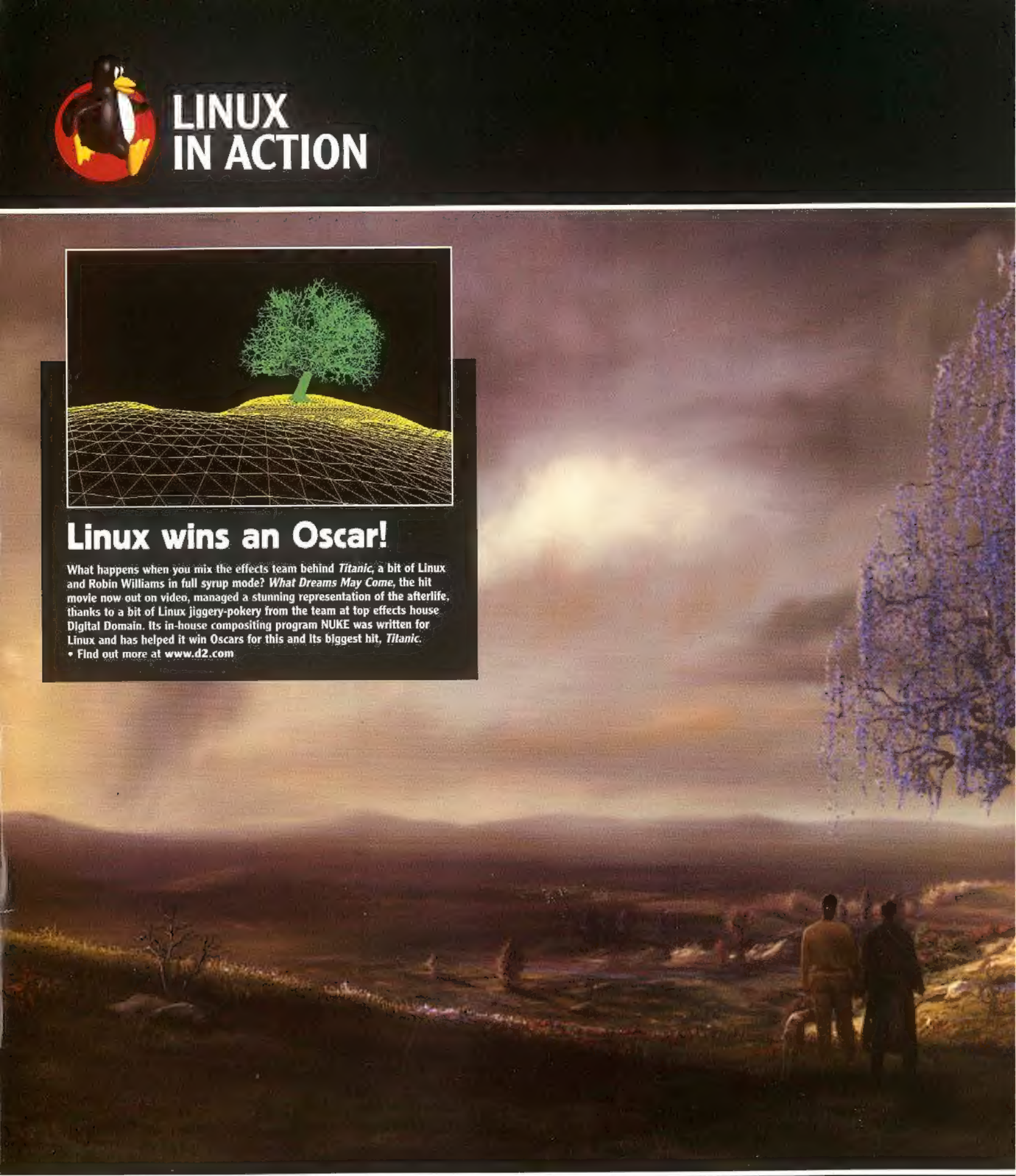


LINUX IN ACTION

Linux wins an Oscar!

What happens when you mix the effects team behind *Titanic*, a bit of Linux and Robin Williams in full syrup mode? *What Dreams May Come*, the hit movie now out on video, managed a stunning representation of the afterlife, thanks to a bit of Linux jiggery-pokery from the team at top effects house Digital Domain. Its in-house compositing program NUKE was written for Linux and has helped it win Oscars for this and its biggest hit, *Titanic*.

• Find out more at www.d2.com

Images: © Digital Domain

MISSION CRITICAL

THE SOURCE

What's happening on Planet Linux...

COMPILE TIME

Chew the Phat

Two teenage kids are bringing out Phat Linux, their own Red Hat-based distribution. Find out whether you'll be hangin' with the homeboys at **www.phatlinux.com**

Definitely maybe

Definite Linux is on general sale throughout the UK in two different boxed sets, standard and advanced Internet server, with UK installation support. Derived from Red Hat, it's aimed at the professional/server market. (See our review on page 36.) **www.dlsl.demon.co.uk**

New SuSE

SuSE 6.2 has finally hit the shelves. Grab yourself a copy at your nearest distributor.

Xpresso Linux

A new British Linux distribution is out now. Xpresso Linux is aimed at the desktop user and you can find out more details at **www.xpresso.org**, or see our batch test on page 43.

Linux Alpha C

Lucky Linux users with access to an Alpha processor are being asked to help Compaq with a beta test of its new C and Fortran compilers. It's available in RPM format, and has so far been tested under Red Hat 5.2, with some testing under Red Hat 6.0. Get yourself along to **www.unix.digital.com/linux/software.htm** for downloads.

New spreadsheet package for Linux

Business Logic has released Xess Spreadsheet for Linux Standard Edition 4.2. Xess Spreadsheet for Linux is the first spreadsheet designed specifically for X Windows and Motif. Offering Windows-style ease-of-use, it provides a full range of mathematical, statistical, financial, matrix and string functions. Visit **www.blcorp.com**

Sun devours Star

STAROFFICE 5.1 Sun Microsystems to target Office2000 users with StarOffice giveaway

The news that Sun Microsystems has bought the top application suite StarOffice has given Linux yet another boost, but all may not be what it seems.

Sun is continuing to give StarOffice away, which on the face of it seems pretty public-spirited, until you realise who Sun's target is.

Enter, inevitably, Microsoft, 40 per cent of whose revenues derive from its own Office97 and Office2000 applications. Despite denials from Sun's CEO Scott McNealy, Sun's move will be seen in Redmond as a direct threat to Office's dominance and strengthens Sun's ability to sell its server products against Microsoft's.

StarOffice 5.1 is compatible with many of Office's most widely-used file types, and Sun's move will give Office users planning to upgrade to the 2000 version pause for thought.

But Open Source advocates have been wondering if this move is necessarily a good thing for Linux. Inspection of the StarOffice licence agreement reveals that Sun is releasing StarOffice under the same proprietary terms as Java.

However, in the short term, the backing of a large commercial concern for one of Linux's killer apps has to be a good thing – provided Sun doesn't decide to change its mind and charge for it in the future.

LINUX LINKS

File Watcher

filewatcher.org/cat/New_Files.html

This is home to pretty much all the Linux files, games, applications and so on you could want.

Track the latest updates and download them here. It's one of the most comprehensive depository of Linux stuff on the Web.

Linux hardware.net

www.linuxhardware.net/

If you are looking to upgrade your PC and want to know if Linux supports it, find out here. Driver information, help and more is available as well.

LinuxApps

www.linuxapps.com/

New Linux utilities and tools available for download right here.

Linux Hardware Database

hd.datapower.com/

Got a compatibility problem with a piece of hardware? Check this site and find a solution.

Koules

www.paru.cas.cz/~hubicka/koules/English/koules.html

It's already been described as a classic Linux game; now it's time to try it for yourself.

Top 10

The best-selling software at PC World for September 1999

We had to stick this in... check number 10 and you'll see why

1. Tiberian Sun
2. Office 2000 Pro. Upgrade
3. Windows 98 Upgrade v2
4. Office 2000 Premium Upgrade
5. VoiceXpress Professional
6. Norton SystemWorks v2
7. Instant Accounting 2000
8. Viruscan Classic
9. Textbridge Pro 98 & Paperport
10. Linux-Mandrake Deluxe 6.0

Have you got the latest kernel? If not upgrade to 2.2.12 now at kernelnotes.org

GNU beats the snoopers

PRIVACY Linux users worldwide finally get 128-bit encryption

Linux users worldwide now have access to near-unbreakable 128-bit encryption, thanks to the GNU free software project.

GNU Privacy Guard (GnuPG) has been developed outside the United States. It uses no patented algorithms, and is therefore exempt from infamous export restrictions on 128-bit encryption technology. This means that anyone in the world can have access to the most powerful commercially-available software. Brian Youmans, from the Free Software Foundation, commented: "This was all developed outside the US, and that was done deliberately so GnuPG could be distributed both inside and outside the US. The project is not a formal project of the Foundation itself, and we didn't actually pay anyone to work on it, but we are certainly very glad that it happened."

GnuPG has been in beta for nearly a year and is also available for Windows98 in trial form.

www.gnupg.linux.it

GnuPG features in a nutshell

- Full replacement for PGP (Pretty Good Privacy)
- Does not use any patented algorithms
- GPLed, written from scratch
- Can be used as a filter program
- Full OpenPGP implementation
- Better functionality than PGP and some security enhancements
- Decrypts and verifies PGP 5.x messages
- User id is created in a standard format for compatibility
- Support built in for a key expiration date
- Online help
- Integrated support for HKP keyservers (**www.keys.pgp.net**)

State of play

The GNOME versus KDE debate has been raging wildly on the pcplus.linux newsgroup, so it's great to be able to quote some real numbers (thanks to *Linux Journal*) and further wind up one set of protagonists over the other. Sadly it's bad news for the GNOMEite faction.

Matt Chapman's site at **www.plig.org/xwinman/others.html** lists a bunch of window managers. In a recent vote, the favourite was Window-Maker (35% of votes cast), followed by Afterstep (16%). KDE strolled in with 16%. But despite GNOME's rugged good looks, the poor thing staggered in bleeding with just 5%. We don't want to say any more... (ducks quickly).

MOVERS AND SHAKERS

Who's been making waves in the world of Linux...

Dell gets the Linux taste

Dell Computer is adding Linux to its popular Dimension desktop PCs. Linux will be offered as an option alongside Microsoft's Windows95, 98 and NT.

www.dell.com

KOffice strengthens team

The team behind the KDE interface is teaming up with Mandrake to develop KOffice, an office package for Linux. KOffice currently includes a word processor with some desktop publishing features, a spreadsheet, a presentation application, a vector drawing program, a diagram creator, a formula editor and an image viewer. It's also possible to embed any KOffice component in a different KOffice application – mixing a spreadsheet and a word processor document, for example.

koffice.kde.org

Linux addresses 4Gb RAM

Teams from SuSE and Siemens have completed a Linux extension which allows the use of up to 4Gb of memory on Intel-based servers. Grab the patch at the SuSE FTP server (see **www.suse.com/ftp_new.html**).

KDE sponsorship boost

KDE got a boost earlier this month when the second developer meeting was supported by SuSE and Caldera. Fifty KDE core developers from all over the world came together to work on the future development of KDE. Waldo Bastian, KDE core developer, said: "Although we are in constant contact via the Internet, most of us have never met each other in person." SuSE commented: "By supporting events like this we make sure that the KDE team can continue its marvellous work at an even faster pace."

Inprise hot for Linux

Inprise, maker of Borland development tools, is supporting Linux, with C, C++ and Delphi on their way.

www.inprise.com

Borland is also to team up with Corel to joint-promote each other's forthcoming Linux products. Finally, J-Builder, Borland's Java compiler, is available now for preview at **www.borland. com/jbuilder/linux**

> **"Gartner Group reported that in 1998, 65% of developers identified Windows as their primary target platform. In 2000, Gartner is predicting that number goes down to 40%. Why? The developers want alternatives to a shrinking Windows base"**
>
> – Bob St John, Serenity Systems

ESSENTIAL LINUX 4 books you simply must read

Teach Yourself Linux in 10 Minutes

John Ray

ISBN: 0-672-31524-6
RRP: £10.99
Tel: 0845 147 3626

This is aimed at Linux beginners to people who have some Linux knowledge. Work your way through basic Linux commands and learn about the Linux environment, file utilities and customising your environment.

The Artists' Guide to the GIMP

Michael J Hammel

ISBN: 1-57831-011-3
£27.03
Tel: 0845 147 3626

Find your way round the GIMP, the Photoshop-quality image-manipulation program, with this cleanly laid out getting started guide. Plus find all the tools you need to get creative on the accompanying CD.

Linux Installation and Getting Started

Matt Welsh

ISBN: 0-916151-78-6
£13.00
Tel: 0845 147 3626

This concentrates on the Slackware distros of Linux but is applicable to all variants. It comes with a tutorial for the beginner and moves on to cover more technical stuff such as net-working with TCP/IP for the expert.

Linux Undercover

Edited by Eric S Raymond

ISBN: 1-88817205-3
£25.00
Tel: 0845 147 3626

You'd have to be pretty dedicated to Linux to read all 2,000 pages of this tome. That said, it has sections for beginners and experts alike, covering everything from the history of Linux to the GNU Public Licence. A big read.

USER GROUPS

What's going down around your way...

The rude health of the Linux community can be seen in the number of user groups springing up all over the place. To find out what's happening near you, take a look at this guide. (Thanks to all those who responded to our requests for information.) To see the full user group list, visit **www.lug.org.uk**

There's also a list called **bits@lists.lug.org.uk** where you can place your "wanted" and "for sale" items for barter. You'll have to subscribe first as it's a closed list. Good luck!

TYNESIDE

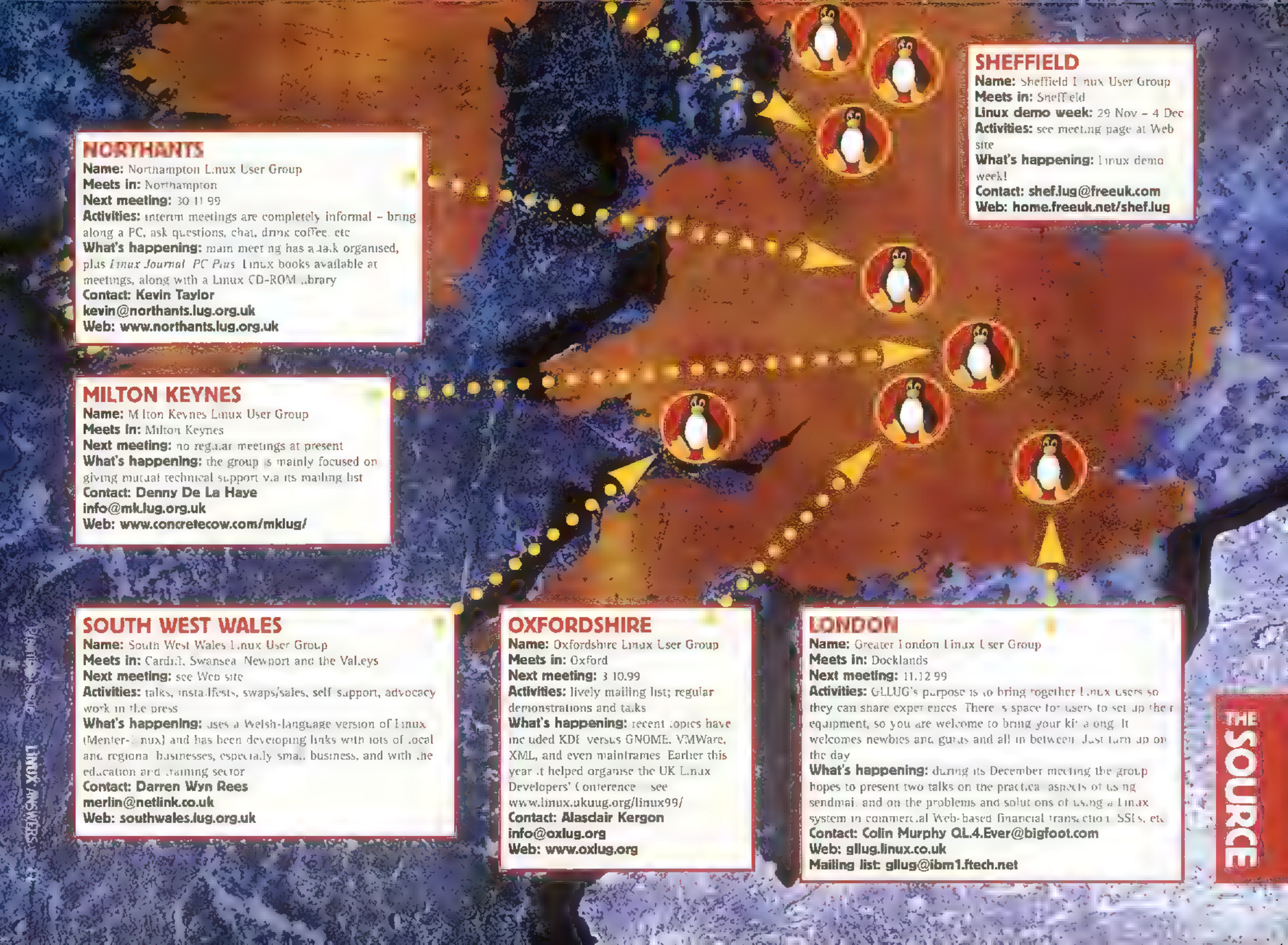
Name: Tyneside Linux User Group
Meets in: not applicable, virtual group only
Activities: group is very young, no real activities, about 10 members so far
What's happening: the Web site contains a forum for help and advice
Contact: tynelug-owner@egroups.com
Web: www.egroups.com/group/tynelug/

WEST YORKSHIRE

Name: West Yorkshire Linux User Group
Meets in: E.C. Stoner Building, University of Leeds
Next meeting: 8.11.99
Activities: it has 130 people on its mailing list, and anything from 20-50 people turn up to its meetings. The meetings start at 7pm, and tea and coffee and chat are available from 6:30pm onwards
What's happening: presentations, lectures, demos, Q&A sessions and beer!
Contact: Jim Jackson jj@scs.leeds.ac.uk
Web: www.scs.leeds.ac.uk/wylug
Mailing list: wylug@scs.leeds.ac.uk

MANCHESTER

Name: Manchester Linux User Group
Meets in: Computer Building, University of Manchester, Oxford Road
Next meeting: 20.11.99
Activities: there's no membership fee, so go along any time. It tries to maintain good relations with other LUGs, and often goes to meetings in Sheffield and Leeds
What's happening: at recent meetings it's had an installfest, a presentation about PGP with a key-signing session, Beowulf clusters, Linux on non-Intel machines, Web proxy cache servers, and security
Contact: John Heaton john@manchester.ac.uk
Web: www.manlug.man.ac.uk
Mailing lists: manlug@mcc.ac.uk, linux-users@mcc.ac.u



NORTHANTS

Name: Northampton Linux User Group
Meets in: Northampton
Next meeting: 30 11 99
Activities: interim meetings are completely informal – bring along a PC, ask questions, chat, drink coffee, etc
What's happening: main meeting has a talk organised, plus *Linux Journal*, *PC Plus* Linux books available at meetings, along with a Linux CD-ROM library
Contact: Kevin Taylor
kevin@northants.lug.org.uk
Web: www.northants.lug.org.uk

SHEFFIELD

Name: Sheffield Linux User Group
Meets in: Sheffield
Linux demo week: 29 Nov – 4 Dec
Activities: see meeting page at Web site
What's happening: Linux demo week!
Contact: shef.lug@freeuk.com
Web: home.freeuk.net/shef.lug

MILTON KEYNES

Name: Milton Keynes Linux User Group
Meets in: Milton Keynes
Next meeting: no regular meetings at present
What's happening: the group is mainly focused on giving mutual technical support via its mailing list
Contact: Denny De La Haye
info@mk.lug.org.uk
Web: www.concretecow.com/mklug/

SOUTH WEST WALES

Name: South West Wales Linux User Group
Meets in: Cardiff, Swansea, Newport and the Valleys
Next meeting: see Web site
Activities: talks, installfests, swaps/sales, self support, advocacy work in the press
What's happening: uses a Welsh-language version of Linux (Menter-Linux) and has been developing links with lots of local and regional businesses, especially small business, and with the education and training sector
Contact: Darren Wyn Rees
merlin@netlink.co.uk
Web: southwales.lug.org.uk

OXFORDSHIRE

Name: Oxfordshire Linux User Group
Meets in: Oxford
Next meeting: 3.10.99
Activities: lively mailing list; regular demonstrations and talks
What's happening: recent topics have included KDE versus GNOME, VMWare, XML, and even mainframes. Earlier this year it helped organise the UK Linux Developers' Conference – see www.linux.ukuug.org/linux99/
Contact: Alasdair Kergon
info@oxlug.org
Web: www.oxlug.org

LONDON

Name: Greater London Linux User Group
Meets in: Docklands
Next meeting: 11.12.99
Activities: GLLUG's purpose is to bring together Linux users so they can share experiences. There's space for users to set up their equipment, so you are welcome to bring your kit along. It welcomes newbies and gurus and all in between. Just turn up on the day
What's happening: during its December meeting the group hopes to present two talks on the practical aspects of using sendmail, and on the problems and solutions of using a Linux system in commercial Web-based financial transactions, SSLs, etc
Contact: Colin Murphy QL.4.Ever@bigfoot.com
Web: gllug.linux.co.uk
Mailing list: gllug@ibm1.ftech.net

Apple thought it had laid this ghost to rest. **Paul Ferris** disagrees

By your command

I have this thing about command line operation.

I love it. I'm crazy, of course. Any 'modern' operating system is GUI based. Everyone knows that. Everyone, that is, apart from me and a few million other UNIX/Linux fanatics. The so-called 'modern' GUI is a Bad Thing™. That said, I have become fond of GNOME and KDE: both are fine examples of modern GUIs; both are going to attract scores of new Linux converts.

I'm not suggesting a GUI is to be done away with. On the contrary, I use my GUI to open terminal windows and type commands, edit text, create HTML and so on. No, I'm attacking the assumption that it's a more modern method of computing. A GUI is not a command line replacement. If anything, a GUI is more a way to automate some commonly executed tasks. It's this automation that makes it attractive, but it's this very automation that also makes it a hobbling device.

One of the reasons that I'm an avid Linux supporter is that the system was built from the ground up on the assumption that the underpinnings would be UNIX-like, with a good, solid command line interpreter to manage things. This is important because, after years of working with computing, I've found that while I can get extremely far with my automation of UNIX, my fellow Windows and Mac users are still plodding along fighting some of the most basic automation tasks. A lot of them are unaware of command line based tools in their toolboxes.

> **A command line is a different animal: it demands training; it demands that you read manuals; it demands patience**

My synopsis is that if you present a new user with a GUI, and they never touch a command line, they begin to associate that GUI with the operating system itself. If they can't do the task the way that the GUI designer intended, and have no experience with command line operation, they are limited to the thoughts that the GUI designer had in mind while creating the beast. At best it's just what the doctor ordered: easy completion of a common task. At worst, it's demoralising. It's taking away the control that the user has and placing it in the mind of the person who coded the interface.

Big on demands

A command line is a different animal. It demands training; it demands that you read manuals, it demands patience. But, in the long run, it delivers so much more.

At best it's very efficient – often a good command line operator can surpass the efficiency of a GUI interface. At worst it's an animal that requires more training or more study. But it is in the pinches and trenches of mis-operation that a command line shines. A good command line user can work around a problem or accomplish a task in a multitude of ways that would be missing from a GUI – even a well thought-out one.

And so back to where I started: Linux as compared to Mac or Windows. Although Windows-based systems ship with something that is referred to as a command line interpreter, the truth of the matter is that this is to be treated as a last resort. With the advent of the so-called New Technology (Windows NT), the command line is only partially capable of accomplishing total configuration of the operating system. In other words, Microsoft inhaled Apple's smoke.

Learning while doing

By embracing this paradigm, Microsoft shut out the ability for end users to learn more than just what was available at the time of programming. I'll even go one step further here, both Microsoft and Apple removed the power for the user to innovate on the desktop. They removed the tools needed to create automation on the fly. I'm not talking joke items like the hokey Windows macro recorder here, I'm talking real automation that you can count on day in and day out, automation based upon standards that don't change in the wind.

And they still don't get it. Microsoft will make available Korn shell for Windows 2000 (part of a UNIX option pack being rolled into the NT series), but it hasn't embraced the power of Linux – NT still has a lot of tasks that are totally GUI-centric.

Thinking outside the box entails a lot. It means giving up on ideas that limit perception and therefore limit the possibilities available. Giving a user just a GUI is like providing them with a car but removing the gas pedal: they can get there, but mysteriously it's just not as fast as you think it could be.

• *Paul is a columnist for Linux Today*

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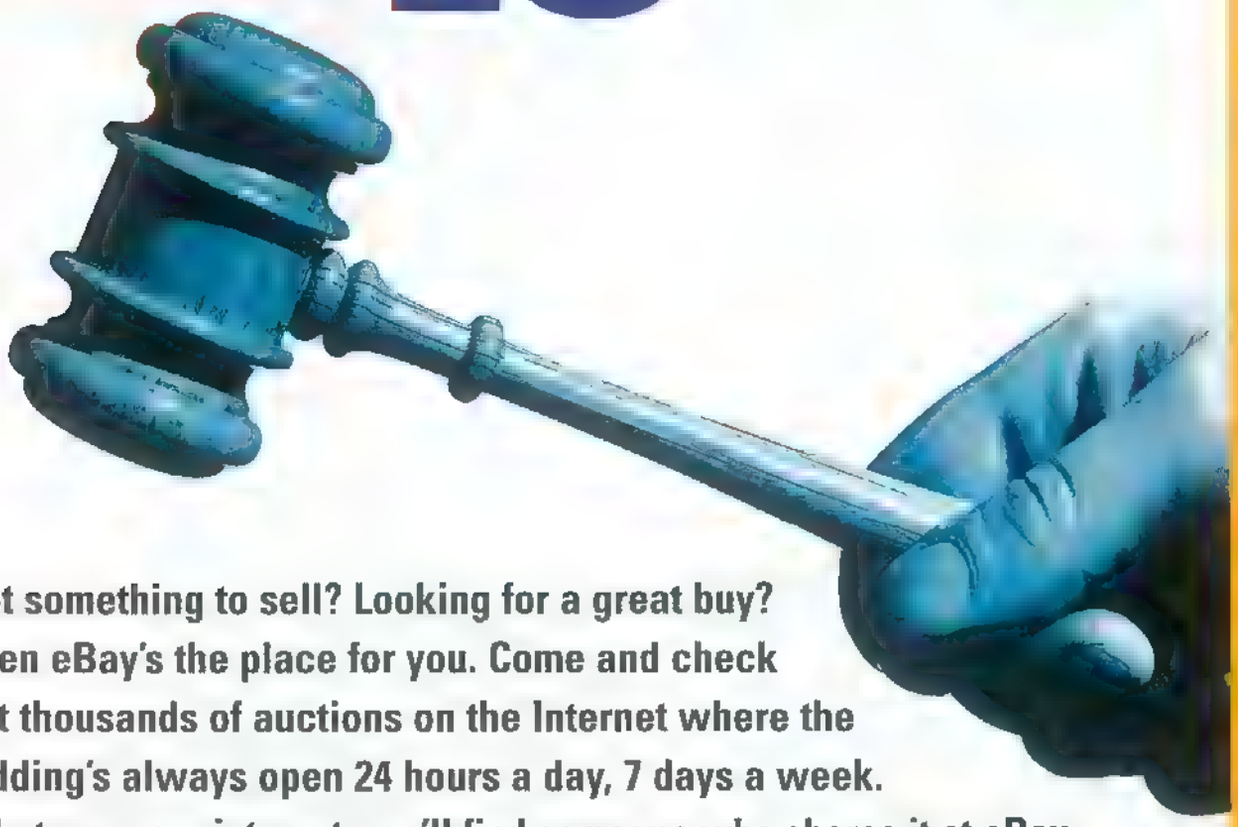

Got something to sell? Looking for a great buy? Then eBay's the place for you. Come and check out thousands of auctions on the Internet where the bidding's always open 24 hours a day, 7 days a week. Whatever your interest, you'll find someone who shares it at eBay.

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www.ebay.co.uk

PRE-TEST: COREL LINUX

Is this the Linux to take on Windows98?

A new Linux is coming which has big company backing, is compatible with Windows applications and promises to be easier to use than anything else out there. **Chris Jones** asks: is Corel Linux the next big thing or is it too good to be true?

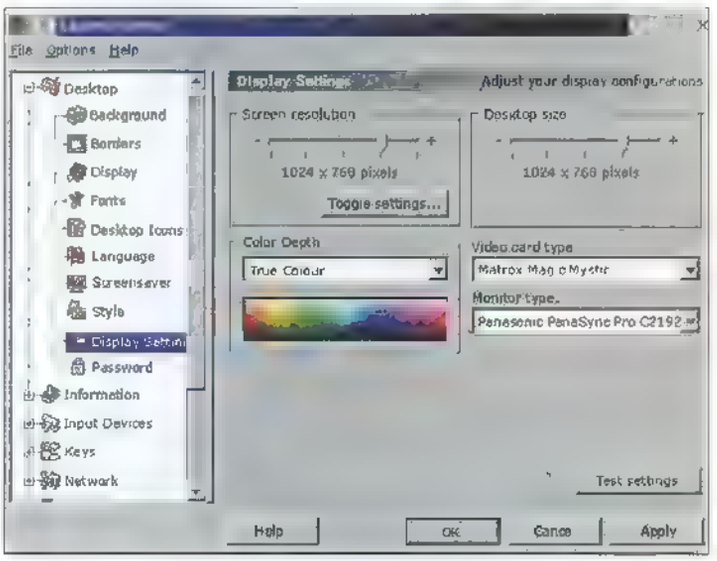
Wouldn't it be great to have a version of Linux for desktop PCs that's as easy to use as Windows, has few installation hassles, and plenty of applications ready to go?

This is what Corel is hoping to achieve with the release of Corel Linux. We've been lucky enough to have the chance to see an early version of it – the complete installation should be available in January.

Early versions of Linux used complex installation processes and quickly gained a reputation for being hard to get to grips with. While most have opted for simple text-based installers, a few have started to use graphical installers in the hope of making the process easier and more in line with what people are used to. Corel is addressing this in some depth. One example is that it will no longer be necessary to partition the hard drive when installing Corel Linux alongside Windows.

Getting going

The two remaining key areas where Linux fails to make the grade for a desktop operating system are applications and the desktop itself. Without the former, the operating system serves no useful purpose, and without a friendly desktop interface, it is hard to use and presents a huge learning curve to inexperienced users.

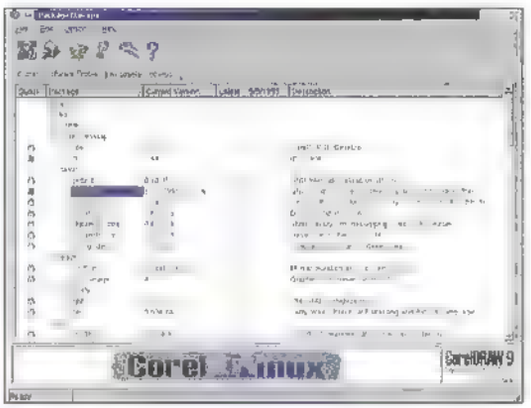


The Control Centre provides a simple-to-use interface to the more complicated configuration elements of Linux, such as configuring X Windows' display modes

Corel Linux will be the easiest operating system on the market. After booting from the CD or a boot disk, you are presented with a few simple questions, after which the software is installed (this can take as little as four minutes on a reasonably capable machine). A reboot later and Linux is installed on the machine and ready to use. (It's worth noting that apart from a substantial core change like a kernel upgrade, everything on a Linux machine is configurable without having to reboot.)

Configuring the system is also easy, thanks to the single GUI-based control centre, something you will need to use if you are connected to a network. The Corel installer configures as much of the system as it can without user intervention using Linux's Plug-and-Play support, but you do have to enter some settings (such as network IP addresses, etc).

One of the areas in which Linux has traditionally been unhelpful for new users is that of drives and printers – unlike in Windows, inserting a CD-ROM is not enough to access it, the operating system must be told it is there before it will allow you to use it. Corel has done



Keeping your system up to date is a simple process, requiring little more than a few mouse clicks

Does Windows emulation work?

No matter how good Corel Linux is, there is a staggering number of applications out there that need Windows to run on. To combat this, Corel has chosen to ship WINE with its distribution. WINE is a project that aims to allow unmodified Windows programs to run seamlessly on Linux. It does this by providing a Linux implementation of all the Windows system functions an application needs to run, access files, print, etc.

The WINE authors have set themselves a mammoth task, especially considering the size of the Windows libraries they have to replace. Development has been underway for several years, and since January this year, Corel has had a team of developers working with the WINE authors to speed up its progress (being an Open Source project, all the changes/improvements Corel makes to WINE are freely available).

At the time of writing, around 90 per cent of the total project had been completed and it runs Corel's existing Windows applications very well - as fast, if not faster than in Windows with the same features and the added bonuses that Linux brings. This is a real boon for all users of Linux, not just Corel's users, as they can run all their applications, Windows and Linux from a single operating system.

away with this, and when a storage medium of some kind is inserted (eg a CD-ROM, Zip Disk, etc), it will be available for use straightaway

Support

A downside of something as complex as Linux is that there is a lot that can go wrong, from misconfigurations to incompatibilities with hardware. Some of the existing Linux distributors provide limited installation support and the facility to purchase further support as required. Corel will be offering a similar support structure, but has the advantage over other distributors of having several years of experience supporting its own applications.

It is working with the existing Linux support company LinuxCare to provide its users with access to the best Linux support available and a range of support plans from per-incident charging to 24x7 support contracts. It also supplies high-quality online help and printed manuals to guide you through the installation and introduce you to Linux.

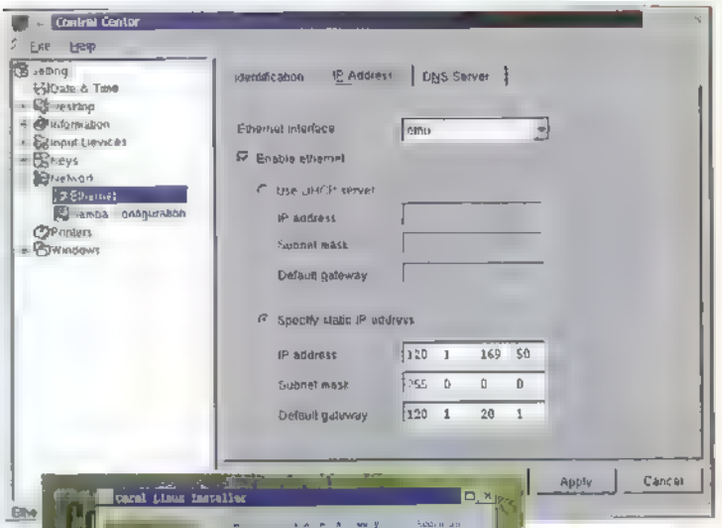
Printing

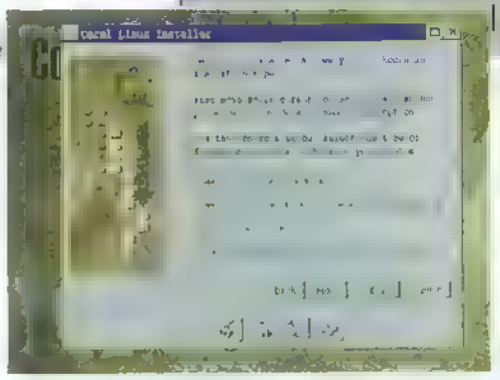
Using the experience gained from creating WordPerfect (which is renowned for its excellent printing support), Corel has enhanced the printing and font capabilities in Corel Linux to make it not only easier to use than the somewhat archaic printing systems Linux inherited from the UNIXes, but also to make it more powerful and higher quality, especially font rasterising – the process of turning the text seen on screen into an image that looks the same on paper.

A big problem with distributing software for Linux and Linux distributions is that there is still little support from retail chains (although this is changing, particularly in the USA), and while a typical local computer shop may have hundreds of Windows software titles available, it probably only has one or two Linux ones.

While it may appal the 'old guard' UNIX and Linux users that their operating systems are becoming easy to use, Linux is flexible enough that it can suit all users, from the most experienced kernel hacker to the beginner. Corel Linux promises to be very much what the desktop PC has been crying out for.

Corel Linux is currently in a closed public beta testing stage and is expected to be released in January with WordPerfect Office 2000 for Linux to follow in February.





Some simple questions and a few minutes of installing are all that stands between you and Corel Linux

As with the Control Panel in Windows, everything can be configured from a single point, in this case, networking

Corel Linux at-a-glance

Here's a brief comparison of what Linux currently offers and how Corel Linux is aiming to improve it:

Installation
Now: unintuitive and complex procedure involving partitioning, configuration, unfriendly prompts which can take an hour or more
To come: no partitioning, simple graphical installation, aim is a four-minute installation. Plus Plug-and-Play-style hardware configuration

Hardware detection, drivers
Now: UNIX-style 'telling Linux what is there before it can be accessed'
To come: auto-mounting CD-ROMs, ZIP disks, etc

File management
Now: access to files by typing shell commands into a terminal window
To come: Windows Explorer-style file management, integrated FTP and Web support

Installing software
Now: use of the package manager to install and remove programs and upgrades
To come: Corel Package Manager provides easy click-and-install access to upgrades and so on

Applications
Now: mostly freeware with the odd commercial-type application such as StarOffice
To come: support for a raft of Corel's application suites such as WordPerfect Office, CorelDRAW! and QuattroPro

Windows compatibility
Now: limited cross-fertilisation between Linux and Windows files
To come: Corel Linux will ship with WINE, the powerful native Windows emulator. This means you should be able to run nearly all your current Windows applications within Linux as fast as in Windows

Open Source
Now: concerns in several quarters that Corel would commercialise aspects of Linux to the detriment of the Open Source movement
To come: enhancements above, like the Corel File Manager, are being released under the Open Source licence

New ways to manage files

Most Linux users are used to accessing their files via shell commands typed into a terminal window, rather than the visual process that the majority of Windows users are familiar with, and this is another concern Corel has addressed by developing the Corel File Manager. Working in a similar fashion to Windows Explorer, CFM makes it easy to view and manipulate the contents of local and network drives (as well as having an integrated Web and FTP browser).

The network drive support includes SMB (Windows sharing) and NFS (a UNIX file sharing system), something that will make integrating a Linux machine into an existing network simple. The graphical login presented when the system boots also allows the user to log into their network 'domain' (a facility used widely on Windows networks).

Illustrations Eddie Bowen

Whether you want to dip your toe into the water or jump right in up to your neck, the time to discover Linux has arrived. Over the next 14 pages, we explain what Linux is, what you can use it for and how to install it from our Cover CD. **Vince Veselosky** reveals all

START HERE!

1 What is Linux?

Developed by enthusiasts and given away for free, it's the fastest-growing operating system in the world. But why?

Welcome to Linux, the fastest-growing operating system in the world. Linux is brilliant and we're going to show you why millions of people around the world agree.

Linux is a variant of UNIX and was created in 1991 partly as a reaction against the poor quality of operating system design from Microsoft, and partly as a step in support of the Open Source movement (see page 30).

Poor operating system design isn't just a technical issue – it affects a PC's performance and locks people into expensive upgrade cycles. Most of us have suffered the frustrations of Windows crashing at the most inopportune moment, and many of us have cursed at having to upgrade our hardware because the latest release of Windows is so bloated it will hardly move without the newest gear. Linux avoids all this.

Linux offers the user unrivalled control over PC hardware, but the trade-off is that it is still some way short of the ease of use offered by Windows or MacOS (although this is changing fast). This manifests itself in several ways. First, there are six or so major Linux distributions (or versions) and countless other minor ones, not all of them 100 per cent compatible with each other (see page 43).

Second, most of the Linuxes, being based on UNIX, use an unintuitive set of DOS like commands. This won't worry computer scientists but it does provide a barrier if you are used to graphical user interfaces (GUIs) like Windows. The Linux community has recognised this and there are now numerous GUIs available. The two main ones are GNOME and KDE. Both have their fans and detractors but, at the final count, each is probably as good as the other.

However, in the interests of simplicity and for the purposes of this feature, we're going to concentrate on KDE.

What is the kernel?

The most important part of Linux is the kernel. This handles the computer's most fundamental input/output operations, schedules processing, deals with the memory and contains the major hardware drivers apart from graphics.

The kernel is the most frequently upgraded part of Linux and the same kernel is common to all the different flavours of Linux around. It is able to maintain this coherence because its definitive form is edited and tweaked by Linus Torvalds himself from submissions from a number of kernel developers around the world.

New versions of the kernel are periodically released over the Internet. Therefore, it's important to know which kernel you have and how to upgrade it when a new one appears.

The most up-to-date kernel is version 2.2.12. The first number is the major version. The second is the minor version. The third is the revision level. As you might expect with any software product, the revision level frequently changes.

Any kernel whose minor version is an odd number is a beta and is probably unstable. Don't install it. Conversely, an even number means it's stable. Version 2.4.x is just around the corner and you'll be able to upgrade it yourself with the help of our guide on page 66.

Now it's time to look at Red Hat 6.0 (on our Cover CD) to see what Linux can do for you. Installing it takes about an hour and requires some planning, so let's get started.

DID YOU KNOW...? The smallest penguin today weighs in at 1Kg and is 40cm tall

Why you'll want to give it a try

So is Linux *really* better than Windows?

If you use Windows for little more than word processing, then swapping to Linux is not for you... at least, not yet. However, if you are more of a power user, there are ten good reasons why you may want to make the switch:

1 Linux rarely crashes and any bugs that are found are fixed immediately by the Linux community. Patches can be available within hours. This means you don't have to back up or maintain your distribution to the same extent

2 Most Linux distributions come with hundreds of pounds' worth of quality software for free, including WordPerfect 8, StarOffice and GIMP, the Photoshop-quality image-editing program (see page 50)

3 Linux is small and fast - you can happily run it on a 486

4 Linux removes you from the Wintel upgrade cycle as core elements of the operating system can be upgraded separately for free

5 Free user support – many Linux distributions provide you with free technical support and advice, unlike Microsoft

6 Linux handles multiple processors; also facilitates sharing of computing resources over a network

7 Multiple customisable desktops each with its own high level of security, beating Windows' User Profiles hands down. Plus you can pick the version of Linux that most suits your needs (see page 43)

8 True multi-tasking

9 Customisable source code – this won't interest any but the most committed Linux enthusiasts, but this allows you to rewrite the kernel yourself to adapt it your PC's own particular quirks

10 Linux comes with the ability to install and run it alongside Windows. This allows you to continue to access your important Windows files – the best of both worlds

START HERE!

2 Will Linux run on my PC?

Before you can crack on and install Red Hat Linux on your PC, you need to find out some essential info about your PC...

Red Hat Linux has been the most popular distribution of Linux for many years now. One of the reasons for this is that the Red Hat installation process is one of the easiest. However, installing an operating system still requires a fair amount of knowledge and skill, and there are bound to be bumps along the way. This tutorial should help to smooth them out.

For this tutorial we are assuming that you have a computer that already has Windows installed and that you want to share the computer, or dual boot, between Windows and Linux rather than replace your existing operating system. We are also assuming that you have a fair amount of computing knowledge and expertise – this is not for computer beginners. If you are installing Linux on a fresh system without another operating system, this tutorial will still get you there – you will just need to skip a few steps that are specific to a dual-boot arrangement.

Before you start you need to check that your hardware is compatible with Linux. Go to 'Support' on Red Hat's Web site and check out your machine's specs.

www.redhat.com

WHAT DO I NEED TO DO FIRST?

Before you can run Linux successfully on your PC, Linux needs to know some important information about the hardware you are using.

You can get nearly all this information from Windows95 or 98, so grab a pen and paper because you're going to need to write some things down. Take a look at the table below to see what you need to find out, and where to look. (When accessing the Windows Control Panel, remember to click on the relevant item to get the information you need!)

Once you have collated all this information, hang on to it for the moment, because you'll need it later when installing Linux on your system.

Okay, that done, you are now ready to move on to stage three.

How to find out what hardware is installed in your PC

Hardware item	What you need to find out	Where you'll get the information
Hard drive	1) Number, size and type of each drive 2) Which drive is primary, secondary, etc 3) Which drives are IDE or SCSI	Windows: Control Panel/System/System Properties/Device Manager
	4) BIOS settings for IDE drives	BIOS
RAM	Amount	Windows: Control Panel/System/System Properties/General
CD-ROM drives	Make & model of non-IDE/non-SCSI drives	Windows: Control Panel/System/System Properties/Device Manager
Any SCSI adaptors	Make & model	Windows: Control Panel/System/System Properties/Device Manager
Mouse	Type, protocol, number of buttons, any serial port settings	Windows: Control Panel/System/System Properties/Device Manager
Video card	Make & model, video RAM	Card documentation
Monitor	Horizontal and vertical refresh rates	Monitor documentation or Web site

START HERE!

3 How do I prepare my hard disk?

Before you can install Linux alongside Windows, you need to grab some hard drive space from Windows. Luckily, there's a tool to do it...

Over the next few pages we're going to talk about how to resize your Windows partition in order to create space for Linux. Then we'll talk about how to use that reclaimed space to create a new partition for Linux.

We're assuming that you have only one partition at the moment (the Windows one) and that it's Scandisked and healthy

First, the background to what what we're going to do: as Windows is hogging the entire hard drive at the moment, we need to shrink this Windows partition to make room for our new Linux ones. Unfortunately, most operating systems do not have the built in ability to resize their own partitions

However each Linux distribution comes with tools for resizing Windows partitions. For Red Hat, that tool is FIPS,

We need to shrink the Windows partition to make room for our new Linux ones

the First Interactive Partition Splitter You will find FIPS on your Red Hat Linux CD-ROM in the directory called DOSUTILS

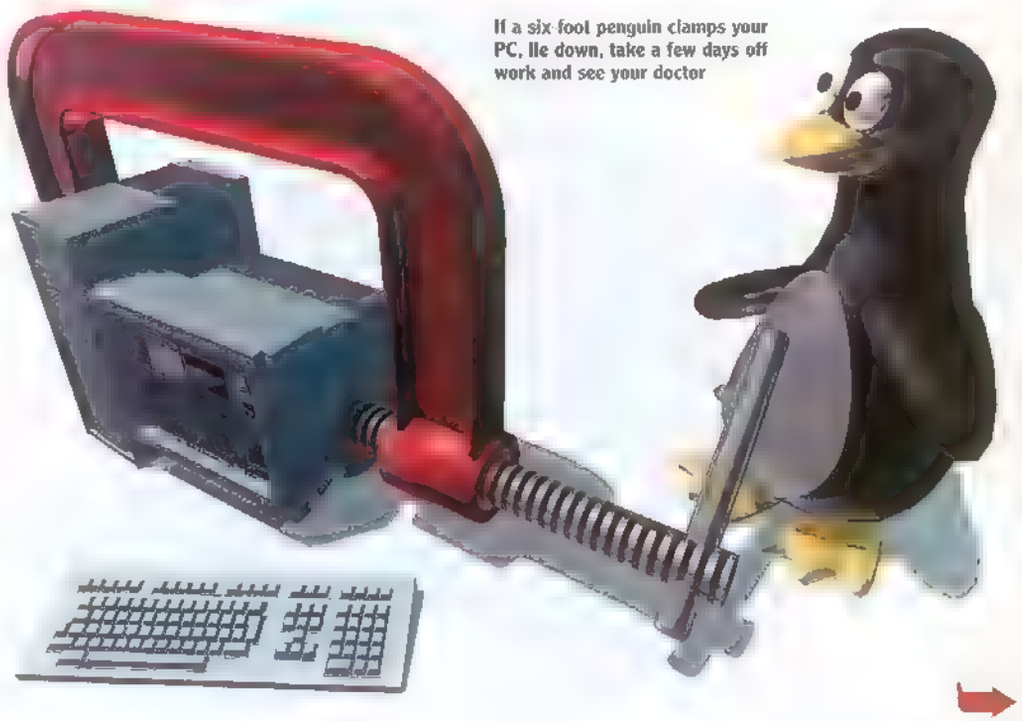
We'll show you how to use FIPS overleaf – it's not the easiest piece of software to use in the world, so if you have PartitionMagic, or something that performs a similar resizing function, we suggest that you use that instead. However, if not, before you can resize your Windows partition using FIPS, you must do the following things

- Delete any files from your hard drive that are not being used, for example any old files in the C:\windows\temp folder, and then empty your recycle bin.
- Check your file system for errors using Scandisk.
- Make a note of how much space is available on your hard disk. If this is less than the space required to load Linux (600Mb – 1.6Gb, depending on what you want to install), you will need to delete more files or uninstall some software to make room.
- Finally, defragment your hard drive The purpose of this step is to consolidate all your data at the 'front' of the drive so there is room at the 'back' for your new partition Remember that the new partition will contain only empty space, so the free clusters on your drive must be adjacent to each other to be used. Therefore, make sure the Defragmentation Method is set to 'Full defragmentation (both files and free space)'

If you are using Windows98, uncheck the option 'Rearrange program files so my programs start faster' to achieve the same effect. This process can take from a few minutes to several hours

WARNING

FIPS is an experimental product. As such we cannot accept any responsibility or liability for damage resulting from your use or misuse of FIPS. Before you begin, make sure you back up your system and that your backup is usable



If a six foot penguin clamps your PC, lie down, take a few days off work and see your doctor

START HERE!

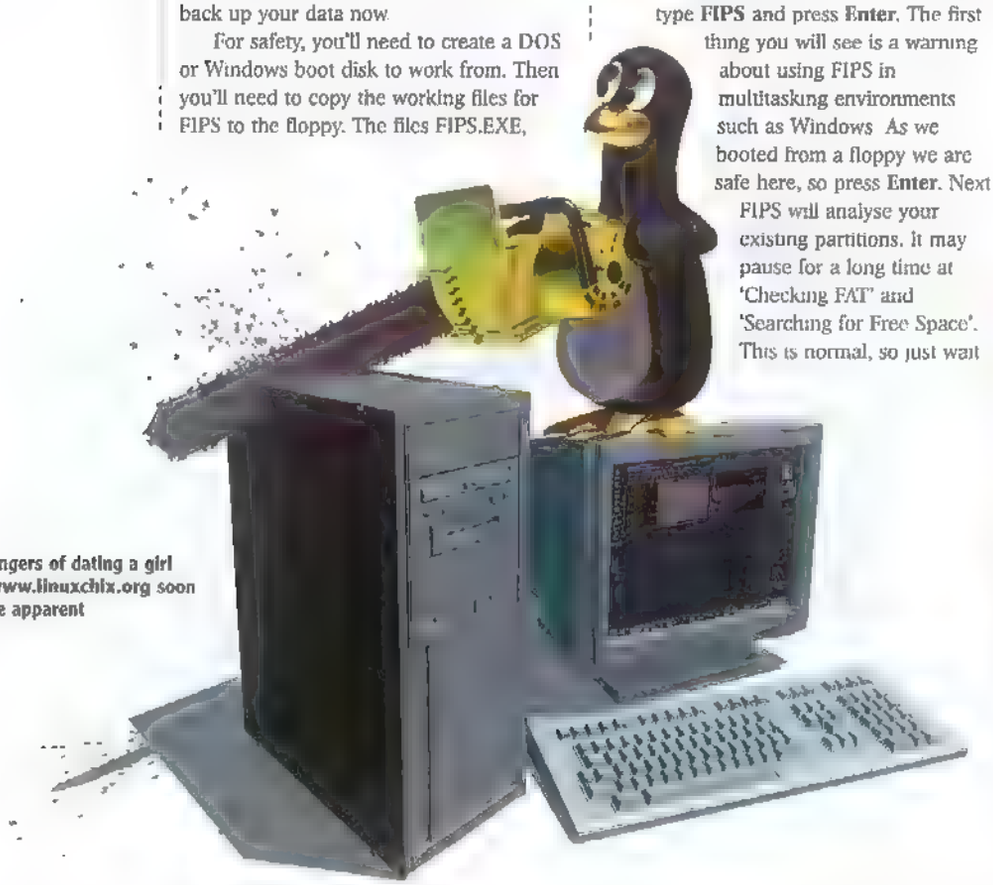
4 How do I make a Linux partition?

With the hard drive prepared and ready for partitioning, you can now create the Linux partition itself

Remember that the aim of using FIPS is to create space that will then be used for the Linux partition. Before using FIPS, read the FIPS.DOC text file which accompanies the program. Also, when running FIPS you should carefully read all the messages it displays. Most importantly, FIPS comes with no warranty. Although it has been used safely many times, there is always the chance it could damage the data on your hard drive. So back up your data now.

For safety, you'll need to create a DOS or Windows boot disk to work from. Then you'll need to copy the working files for FIPS to the floppy. The files FIPS.EXE, RESTORRB.EXE, and ERRORS.TXT are mandatory. You may also want to copy the documentation files included with FIPS. You can find all these files on our CD under the DOSUTILS directory. If more than one version of FIPS is present, you should use the most recent version to get the best support for Windows98 FAT32 drives. When your data is backed up and you are ready to go, restart your computer and boot from the new floppy.

When you arrive at the A:\>; prompt, type **FIPS** and press **Enter**. The first thing you will see is a warning about using FIPS in multitasking environments such as Windows. As we booted from a floppy we are safe here, so press **Enter**. Next FIPS will analyse your existing partitions. It may pause for a long time at 'Checking FAT' and 'Searching for Free Space'. This is normal, so just wait. The bigger your hard drive, the longer this takes. When FIPS is done with its analysis, it displays the results. You may get a warning of something wrong with your FAT. Read the message carefully and you will find that this is normal with large hard drives and won't prevent FIPS from working properly. (Remember, always read the messages!)



The dangers of dating a girl from www.linuxchix.org soon became apparent

Making adjustments

Next FIPS will show you how it plans to split the existing partition and you will have the opportunity to make changes. By default, FIPS appears to take two thirds of the available free space for the new partition it creates. You may want to adjust the partitions to allow Windows to keep more space, especially if you plan to install any new software on Windows. Adjust

If you value your data, back it up before you begin

yours based on your own needs, but we'd recommend using at least 1,024Mb for each operating system, space permitting.

Use the Up and Down arrow keys to make large changes (10 cylinders at a time) and the Left and Right arrow keys for small ones (1 cylinder at a time). The size of the existing partition is shown on the left and the size of your new partition on the right. In the middle is the cylinder number where the split will take place.

When you are satisfied with your new partition plan, press **Enter**. FIPS displays information about the new partitions and

asks permission to write it to disk. Your hard drive has not been altered at this point. You may choose to write this configuration to disk or re-edit the partition table, which starts the process over from the beginning. On our test machine, when we chose to re-edit we received an error message that said FIPS couldn't find some files it needed. If this happens to you, just press **Control-Alt-Delete** to reboot from the floppy and start over. This did not cause us any trouble.

Time to back up

When you choose to write the new partitions, FIPS will offer to make a backup of your existing boot sector. Unless you like living dangerously, you should definitely do this. The backup file it creates is only 1K in size, and it will be invaluable if anything goes wrong.

After FIPS completes its work it displays another message instructing you to run Scandisk on your old partition. We found that Windows sometimes miscalculates the used and free space on our drive after using FIPS, but Scandisk corrects this problem. If you choose to restore your original partition scheme using the RESTORRB utility, you should run Scandisk after this as well

Unless you like living dangerously, you should definitely back up

After FIPS was done, we received another error: 'Memory Allocation Error, Unable to Load COMMAND.COM' Apparently this is a common message and nothing to be alarmed about. If you see this, just press **Control-Alt-Delete** to reboot and all should be well. Your hard drive should be unaffected by this.

At this point, FIPS has made space and has created a second partition using this space. Both partitions will be designated as 'Primary'. The second partition, the one we've just created, is now occupying the space where you'll want to install Linux

Now for the slightly confusing bit: the Linux setup utility, when it's run, will want to create its *own* partitions in this space, so you need to delete the partition you've just created (it's the space we're interested in at the moment, rather than the partition itself, so don't worry about it).

Do this now by booting from a DOS boot floppy and running the DOS utility FDISK from the DOS prompt. Note: this is not the same utility as the similarly-named Linux utility fdisk!

Be careful! Do not delete the first partition. That is where Windows lives! If you do, you will lose all your Windows programs and data.

5 How to install Red Hat 6.0

With your hard drive prepared and Windows resized, it's time to insert our cover CD and get going!

1) RUN LINUX SETUP

This is the program which installs Linux for you. This is what you'll need to do:

First pop in the Linux CD and reboot. Linux setup will begin automatically (You may need to adjust settings in your PC's BIOS Setup utility. Consult your hardware documentation first.)

If this doesn't work, you will need to make boot floppies from the image files on our CD. This is vital as it protects your PC from crashes and lost data.

On our CD there's a directory called 'images', which contains a series of floppy disk image files. For Red Hat Linux, there are two primary bootable disk images: **boot.img** is used for local installations (eg from a CD-ROM); **bootnet.img** is used for installing Linux across a network or the Internet. There is also a pcmcia.img for laptop installs that require the support of a PCMCIA device (eg a network card).

On a DOS or Windows system, you cannot simply copy one of these files to a floppy disk You must use a special utility called 'rawrite.exe', which you will find in the DOSUTILS directory on our Cover CD. This is a simple program and very easy for beginners to use

Just start it by typing its name at the command prompt (you may need to type the complete path name or change to the directory where rawrite lives)

It will then prompt you for the name of an image file to use (full path name required) and a destination drive. Wait a

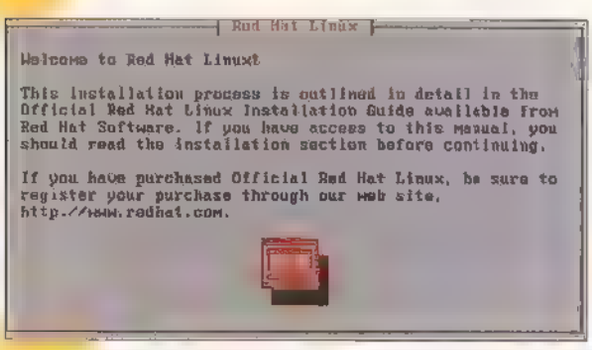
START HERE! How to install Red Hat 6.0

STAGE A: What you'll see first

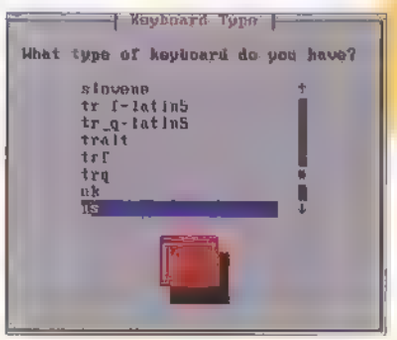
The first stages of installation

The first phase of the installation concerns making sure your PC can recognise what's going on:

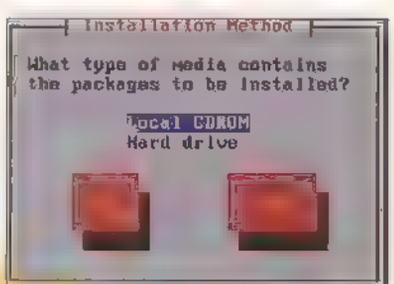
1 The first screen is merely a boot screen. You can press the different function keys and read about what it can do. When you are ready to begin, hit Enter



2 Note at the bottom of the screen the list of available keys. This is consistent throughout the install process, so if you are not sure what to do next, check the bottom line for options. It does not mention that Enter can be used to select items as well as Space. Sorry, no mouse support in the setup program. Press OK to continue



3 First you are asked to select a default language and keyboard layout. Your choice should be obvious



4 Select an installation method. Most will install from the CD-ROM, but if you downloaded Linux from the Internet, or if your CD-ROM is not supported by Linux (unlikely but possible), you can install Linux from files on your hard drive. If you see options here like FTP, SMB, etc, you made the bootnet.img floppy when you wanted the boot.img floppy. Select Local CD-ROM and you will be asked to insert the Linux CD. Once the CD is in place, press OK

DID YOU KNOW...? Older penguins can be more faithful to their mate – if both survive the winter

few minutes, and you've got yourself a boot disk.

2) PLANNING THE LINUX PARTITION

If you've reached step 8 in the box above, you'll need to know more about your Linux partition and how to construct it...

If you are new to Linux, and you like to tinker with things, you should create three Linux partitions. These three partitions shall be called swap, root, and home

Swap

Linux reserves space on your drive to be used as virtual memory. Virtual memory allows your computer to run large programs and perform complex tasks even if it does not have enough physical RAM to do the job. (It is a lot slower, but it works.) This space is commonly called 'swap' space. The amount of swap space required is a matter of religious argument among geeks and hackers, and entire volumes could be written about the subject. To keep it simple, create one swap partition of either 64Mb or 128Mb (you may have to use 127Mb instead, depending on the program you use to create the partition).

If you are short on RAM with plenty of drive space, go large. If you're short on drive space and have 32Mb or more of RAM, then go small.

Root (/)

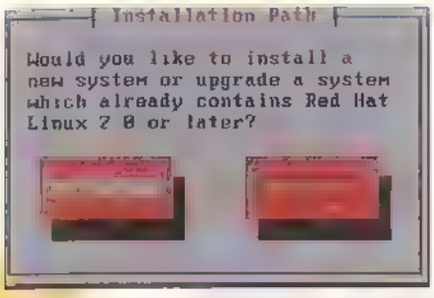
The root file system is represented by a forward slash (/). It is the top of the directory tree, and contains Linux and everything that you install with Linux. This is roughly equivalent to your "C:\" drive under DOS or Windows. You must create a partition for the root directory. (Don't confuse this with the "root" user account, who is the administrator of the system. That's a different kind of root!)

The size of your root partition will vary depending on what you plan to install. Check your distribution's documentation and reserve enough space for a maximum installation, plus at least 100Mb more for temporary space and installation of new software. If you plan to download and try out lots of different software, leave more space. If you have a small hard drive, you can trim back on your installed packages to save space.

The installation we perform in this tutorial takes up less than 400Mb. Your mileage will vary, of course. If you have a giant hard drive, then leave room for future expansion.

Home (/home)

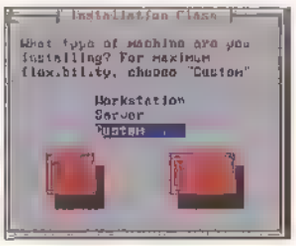
The third and final partition you should create will hold your /home directory. This is the place where all your personal files will be stored. It is roughly equivalent to



5 If you are installing a new copy of Red Hat, choose Install. To upgrade an older version of Red Hat Linux, choose Upgrade. Here we will assume a new install

7 You are now asked whether you have any SCSI adaptors in your system. If you do, Setup will probe for them and try to load the drivers automatically. If the automatic probing fails, you may have to specify what driver to use and what parameters the driver needs to communicate with the card, such as the IO address and IRQ.

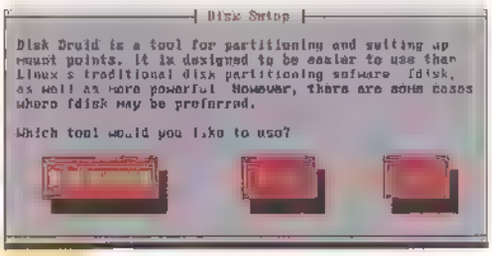
Tip: the IO address is almost always listed in hexadecimal notation, and the number should be preceded with 0x. For example: IO Address = 0x300 For purposes of this tutorial, we'll use the more usual option of no SCSI adaptors



6 Here you can choose what type of installation to perform. This is one of the real strengths of Red Hat Linux. If you choose the Workstation installation, it will do all the tricky work of creating partitions and choosing default packages for you. For the new Linux adopter, this clears some of the highest obstacles to installing Linux.

The Server installation class assumes that you are building a true Linux server. Don't choose this for a dual-boot system. It will destroy all your existing partitions, including your Windows partition.

For this tutorial, we will use the Custom installation class, so that you can see what goes on during a Linux installation and gain a deeper understanding of how Linux works



8 Now's the time to turn the space on your hard drive into a proper Linux partition. Most users will want to use Disk Druid (see page 24). However if your hard drive is over 8Gb in size, you will have to use the Linux utility fdisk (NOT the same as the DOS utility FDISK!)

the 'My Documents' folder on a Windows PC. On a multi user system, each user will have his/her own directory under /home.

Strictly speaking, it is not necessary to create a separate partition for /home. If you do not create a separate partition, your personal files will reside on the root partition like everything else. If you are cramped for space, you may need to configure your machine this way.

The reason we recommend creating a separate partition is that if you are a new Linux user, you are bound to want to play with things, experiment, push the limits of your system. Before long, you will break something so badly that you will need to reinstall, or you'll just want to reinstall with different options or try a different Linux distribution. Having /home on a separate partition makes it pretty easy to wipe out and reinstall Linux without losing any of your valuable data.

Everyone, no matter how experienced they are, hoses up their system at least once, and for the beginner, reinstalling is often the easiest way to fix it. So just plan on it and make it easy for yourself.

Keep your data on a separate /home partition, or keep it backed up on some other medium, and be sure to create the boot floppy when prompted to do so during the installation process. Having a boot floppy has saved my system more than once.

Don't get the wrong impression of Linux here. This reinstall problem is common for new users because we tend to break things while we are learning. Six months from now your system will be purring like a nursing kitten, and you'll go weeks or months without rebooting, let alone reinstalling.

If you like to tinker with things, you should add a third partition

3) HOW TO CREATE THE LINUX PARTITION FOR REAL

Now that you've done all the planning, it's time to get on and create the Linux partition itself.

To create the Linux partition, you can use one of two tools. We recommend you use the Disk Druid option if you can. Turn over for a walkthrough on how to use it.

Your alternative, if your drive is over 8Gb in size, is to use the altogether trickier Linux utility fdisk.

Confusingly, there is also a DOS utility called FDISK which you may previously have used to delete the partition PIPS created. FDISK and fdisk are not the same! Now turn over for details on how to use fdisk to create your Linux partitions.

GOT A LARGE HARD DRIVE?

If you have a large hard drive, you may need to create a small (12Mb) /boot partition below the 1,024th cylinder, otherwise LILO will not be able to boot Linux. See section 2.8 of the Red Hat manual in the \docs\rhmanual \manual folder on our Cover CD.

START HERE! How to install Red Hat 6.0

STAGE B: How to create your Linux partition

How to partition Linux using Disk Druid

WARNING
If your hard drive is larger than 8Mb, do NOT use Disk Druid to create your Linux partitions! Use fdisk instead. See section 4.7 of the Red Hat manual (start from \docs\rhmanual\manual\index.htm on the CD) and the large disk mini-HOWTO (in \docs\HOWTO\mini\Large-Disk). You can still use Disk Druid to set up your mount points once the drive is partitioned

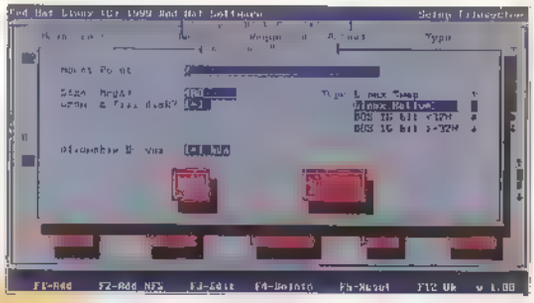
Disk Druid will suit most people – If it's not right for you, see the boxout on fdisk...

Now that you've decided what Linux partitions you need, it's time to choose a tool for the job. Most people will want to use the Disk Druid tool because it is more visual and easier to use.

If your hard disk has more than 1,024 cylinders (8Gb for LBA mode hard drives), and you need to make Linux partitions past the 1,024th cylinder, you will have to use fdisk as Disk Druid does not support these large hard drives. fdisk is an 'old-school' UNIX program, with a character-based command line interface. See the boxout below for more details on using fdisk.

Note: if you have not already deleted the empty partition created by FIPS, you should do this now.

1 The first screen of Disk Druid shows your available drives and existing partitions. Currently we have a Windows partition only. To create new partitions for Linux, choose Add. You are then asked to edit the new partition. First we will create a swap partition. Leave the "Mount Point" blank for now and set the Size to 64. Tab over to Type and use the arrow keys to select Linux Swap. Note that the Mount Point changes when you do this. Select OK



2 Add a partition where Linux will install its files. Call its Mount Point /, the root directory. You will need at least 400Mb, but allocate as much space as you like. If you want the partition to take up all the free space on the disk, select the Grow to fill disk option by highlighting it and pressing the Spacebar. The partition type should remain Linux native. If you decided to create a separate partition for your data, follow the same steps, setting the Mount Point to /home

For large hard drives...

How to use fdisk to make the Linux partition

On running fdisk, you will be asked to pick a hard drive. Select the one where you want Linux installed and choose edit.

The interface can be intimidating at first. Just move slowly and read carefully. Nothing you do is written to the disk until you give the command to do so. If you go wrong, type **q** to quit and start again. Typing **m** gives you a menu of available commands, as follows:

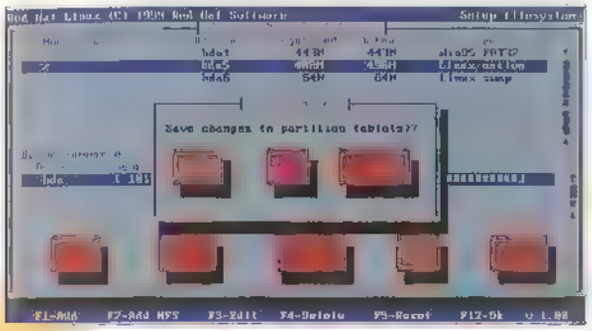
Command and Action
- **a** toggle a bootable flag
- **b** edit bsd disklabel
- **c** toggle the DOS compatibility flag
- **d** delete a partition
- **l** list known partition types
- **m** print this menu
- **n** add a new partition
- **o** create new empty DOS partition table
- **p** print the partition table
- **q** quit without saving changes
- **s** create a new empty Sun disklabel
- **t** change a partition's system id
- **u** change display/entry units
- **v** verify the partition table
- **w** write table to disk and exit
- **x** extra functionality (experts only)

Use the **p** command to see your Windows partition. The numbers you see will be different from this example; they depend upon the size and configuration of your hard drive.

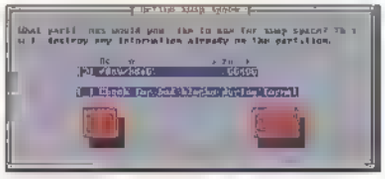
You now need to create some new partitions for Linux. Type **n** for 'new'. You will be asked whether this will be an extended partition or a primary partition. To create more partitions, you need to create a special "extended" partition, which is made to contain sub-partitions called "logical" partitions.

Here we will create an extended partition with **e** and call it partition number **2**. (Partition 1 contains Windows). The first cylinder of a new partition should always be the first available cylinder, so type **452**. Since this is a small hard drive, and the extended partition is meant to be a container for other partitions, we will set the last cylinder to the last available cylinder, "1015" in this case. If you need to do so, type **p** again.

Creating a logical partition
Now you need to create some partitions for Linux. Type **n**. This time fdisk asks whether you want to create a primary or logical partition. Type **l** for 'logical'. Again



3 Notice that Disk Druid shuffles the partitions to create them optimally on your drive. Once you are satisfied with your partition layout, select **OK** or press **F12**. You are asked to verify that you want your changes saved to the disk. If you answer **No**, the disk will remain unchanged. Select **Yes** when ready to proceed



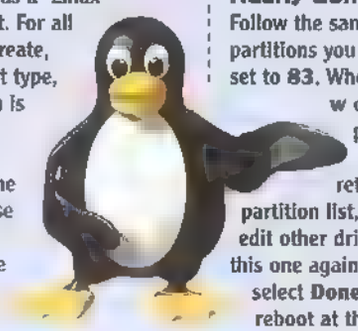
4 You are now asked to format any partitions you have created. It is recommended that you format all the Linux partitions. If you are re-installing Linux, you may have saved your **/home** partition from your previous installation. Be careful not to format that partition if you have already placed data on it. All data is destroyed during the format. If you select the option **Check for bad blocks** Linux will check the hard drive for physical errors as well. This may take a long time. Use your own judgement here

DID YOU KNOW...?

The tallest penguin ever was 1.7 metres tall

fdisk asks for starting and ending cylinders. It is best to create your swap partition first. For this, we will start at the first available cylinder "452", and allocate a size of 64Mb with **+64M**. Type **p** again to review the changes.

Here you must make a change. The partition was created as a "Linux native" type by default. For all other partitions you create, this will be the correct type, but the swap partition is different. You need to change the type to "Linux swap". Enter the **t** command and choose partition number **5**. Next fdisk asks for the hexadecimal code of the partition type you wish to use. Type **L** to see a list of all the supported partition types and their codes. As you can see, fdisk can create just about anything you need. Choose code **82** for Linux swap and type **p** to review changes.



Nearly done...

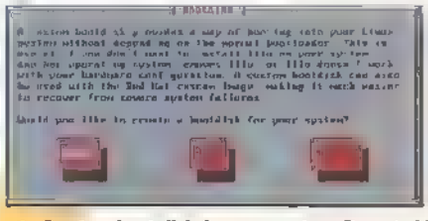
Follow the same steps to create the other partitions you require, leaving the type set to **83**. When you are satisfied, use the **w** command to save the partition table..

You will then be returned to the Red Hat setup partition list, where you may choose to edit other drives or make changes to this one again. When you are finished, select **Done**. You may be asked to reboot at this time.

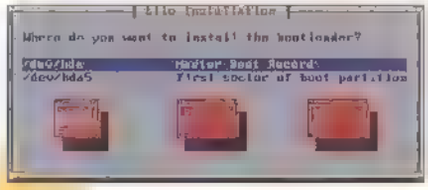
STAGE C: Just in case...

How to make a boot disk

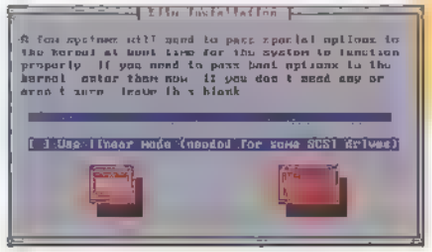
No matter how careful you are, sometimes things go wrong. You need a bit of backup in case the worst should happen...



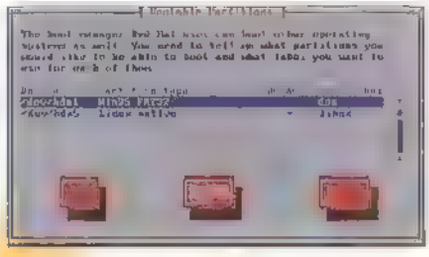
1 Create a boot disk for your system. Do not skip this step! If the boot loader LILO fails to install correctly for some reason, this disk will be your only way to start Linux



2 Now you must configure LILO, the Linux Loader. This is the program that will start Linux on your system. Usually you will want to install LILO in your Master Boot Record. This will give you the opportunity to choose an operating system each time you boot your PC. You can also install LILO to the boot partition (where Linux is installed). This means you will need to make that partition active using fdisk in order to boot Linux. Otherwise, Windows will remain your default



3 LILO can pass special parameters to the Linux kernel at boot time. Leave this blank unless you know what you are doing



4 Here you can configure LILO to boot your new Linux installation or your old Windows installation by default. You may want to edit the label used for each operating system so it is more appropriate

START HERE!

6 How to install applications

For a typical home system, you will want to install the following components (fig 1). This is a list of fairly standard applications, some of which we will be talking about later on in the magazine:

- Printer support
- X Window System
- KDE and/or GNOME
- Mail/WWW/News Tools
- DOS/Windows connectivity
- File managers
- Graphics manipulation
- Dial-up workstation
- Emacs and Emacs with X Windows

If you have some extra space, you may want to install these optional components:

- Console Games
- X Games
- Console Multimedia
- X Multimedia Support

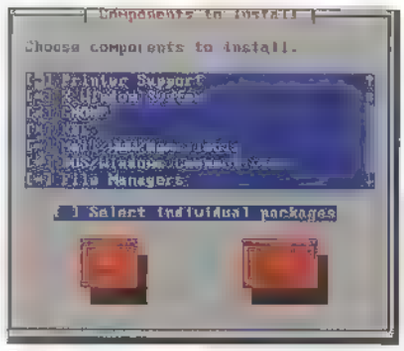


Fig 1

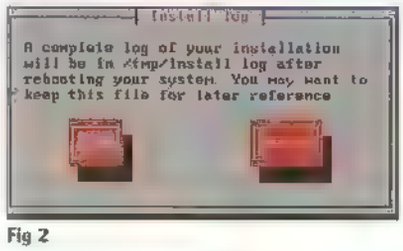


Fig 2

If your Linux system is to be connected to a LAN (local area network), you should include these

- Networked workstation
- SMB (Samba) Connectivity
- IPX/Netware Connectivity

The server components need only be installed if you are planning to use Linux as a server for email, Web, ftp, etc.

You don't need the development components unless you plan to write programs for Linux. These components can take up a great deal of space.

On the other hand, if you have more than 1Gb of space devoted to Linux and want to learn everything there is to know about it, scroll down to the bottom of the list and select 'Everything' (see fig 2)

Setup now automatically formats your partitions and begins to fill your hard drive with software.

Getting straight into it

Linux applications you can use today

It's all very well having a new OS to play with, but what can you actually run on it?

Linux is great – we're all agreed on that. But a raw OS by itself isn't much use to anyone. One of the reasons for Linux's success has been the development of some impressive software, all of which is free and much of which is on our CD.

GIMP

www.gimp.org

What it is: a Photoshop-level image-editing package
What you can do with it: provides full image-editing capabilities; includes effects filters; supports a wide range of image formats
What it can't do: it's a little weak in the pre-press arena, specifically colour separation, although this is being addressed
Is it on the CD? Yes, see pages 50-55 for a complete tutorial

StarOffice

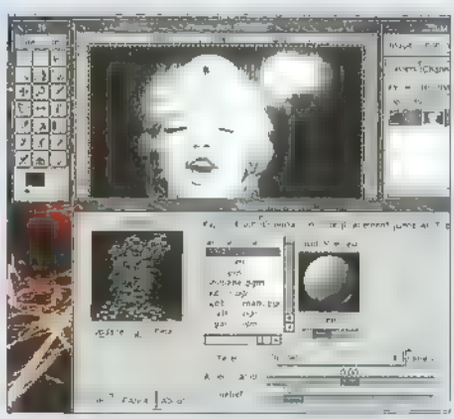
www.sun.com/staroffice

What it is: a Microsoft Office-style application suite
What you can do with it: the full range of Office-style tasks, from word processing to spreadsheets and presentations. Supports the major Microsoft file formats
What it can't do: lacks some of the most powerful Web-integration features of Office2000
Is it on the CD? No, but see 'The Source' on page 8 for the latest news on StarOffice

Corel WordPerfect 8

www.corel.com

What it is: Powerful word processor with Word-style features
What you can do with it: full WP facilities plus basic layout
What it can't do: it's not the WordPerfect suite found on Windows, just a bit of it
Is it on the CD? Yes, see pages 80-81 for more information

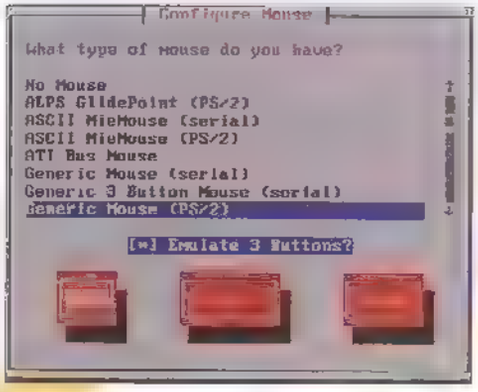


The GIMP will probably become your favourite Linux application. It's powerful and easy to use

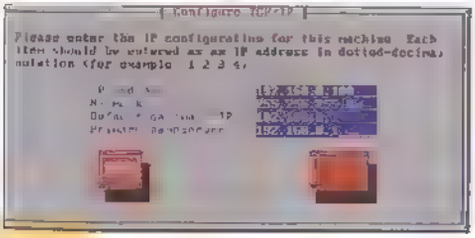
START HERE!

7 How to configure your system

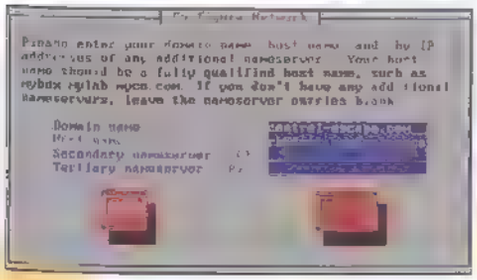
Remember those hardware details you wrote down earlier? Dig them out, you're about to use 'em...



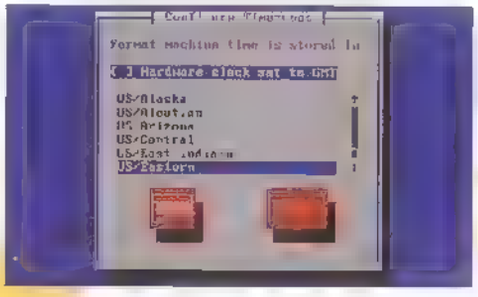
1 After the Linux files have copied to your system, setup will try to detect your mouse. If it guesses wrong, you may select the correct mouse from the list presented. For two-button mice, select the Emulate 3 Buttons option to simulate a middle mouse click by pressing both buttons at the same time



2 If you installed the Networked Workstation package, you will be asked if you want to set up the network. Setup will attempt to detect your network card, and you will be asked to provide network address information, so have this ready



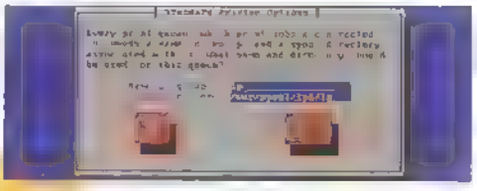
3 You will need to select a hostname for your system. Call it whatever you like



4 Select the correct time zone. For most PCs, the hardware clock will not be set to Greenwich Mean Time (GMT), so leave this field blank unless you have adjusted this yourself

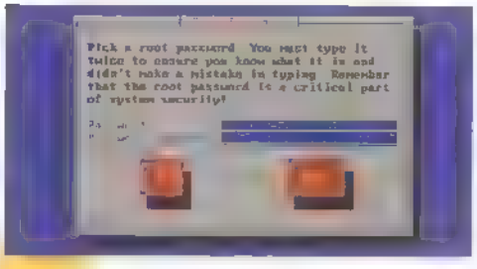
5 Now configure your system services. Generally, the defaults should be fine. You can highlight a service and press F1 to learn what it does if you want to play. You probably should not disable ald, crond, inet, keytable, lpd, or network as these provide essential services and hardware support, although your Linux system can operate without them

6 You are also given the opportunity to configure a printer on your system. It's a good idea to get this out of the way during the install, even if the printer is not yet connected. Linux can print to local and network printers. Normally you would have a local printer



7 Linux requires a name for the print queue. The default name for printers on most UNIX systems is lp. Keep this name and spool directory unless you have a good reason not to. Setup will try to detect the parallel ports on your system. If it guesses incorrectly, give the correct port from the device list shown

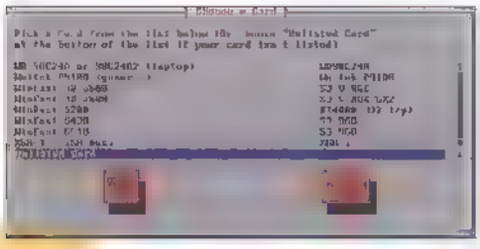
8 Select a driver for your printer. Many printer drivers will have additional options that can be set to correct minor printing problems. These settings can also be adjusted after the printer is installed using printtool. Setup then gives you the opportunity to review and change the printer configuration before saving it



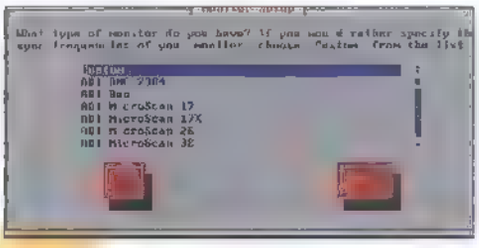
9 Choose a root password. The user root is the administrator of your Linux system and has complete control over everything. Do not forget this password! You must have it to login to Linux the first time. You'll then be asked to choose an Authentication Configuration. You should only enable NIS if you have a Sun authentication server on your network. Shadow passwords and MD5 passwords enhance the security of your system, so leave them on

START HERE!

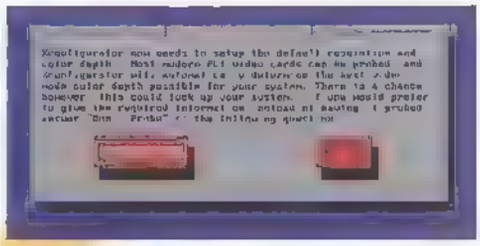
8 How to configure video



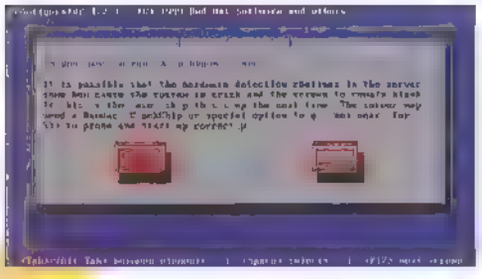
1 Now setup will attempt to detect your video card. Most cards are automatically detected. If yours is not, you may select it from the list presented. If your card is not on the list, choose **Unlisted Card**. Setup will prompt you for the X server needed for your card. You should choose **VGA16** for unsupported cards. This is the **least common denominator** and should work with all VGA-compatible cards



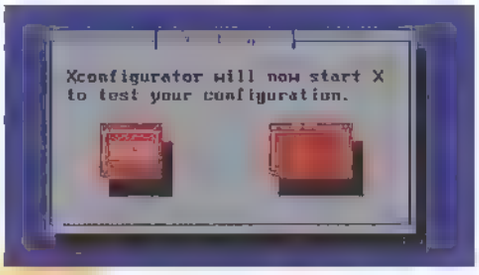
2 Next you will be asked about your monitor. If your model is on the list, just select it. If not, select **Custom**, and then pick the highest resolution supported by your monitor, and then the vertical sync range supported by your monitor. This information should be provided in your monitor's documentation. Some very old monitors can be damaged if you select the wrong numbers here, so be sure to consult your hardware documentation, don't just guess! If in doubt, choose the lowest numbers



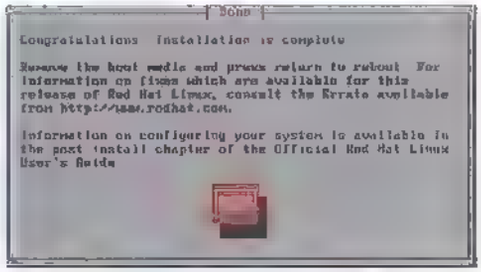
3 Setup can optionally probe for the amount of video memory on your card. Some cards do not allow probing, so you may need to choose the amount manually. If prompted, leave your clockchip configuration set to **No Clockchip Setting**. Choosing the wrong setting can damage your hardware



4 Setup will now try to probe to determine the best video resolution to use. You may choose **Skip** to pick your screen settings manually



5 Setup will now test your video configuration. Your screen will turn some funny colours and finally display a confirmation box. If you can read it and see the buttons to press, it worked! Setup will then ask you if you want to start X automatically every time you boot. Choose **YES**, or you will have to manually start KDE from the command line. Now reboot and prepare to enter the world of Linux



And finally...

Reboot and go!

Now that you've installed everything, you need to reboot – you will see a 'LILO:' before any operating system loads. If you've selected the defaults during installation, type 'dos' here to boot boring old Windows, or 'linux' to boot your funky new system.

Linux will scroll some very impressive text across your screen, and finally give you a box asking for your Login and Password. The first time you boot Linux, your login will be 'root' (all lowercase) and your password the one you chose in stage 7, point 9. Type them in, click **Login**, and you're there. You may be given the chance to choose your desktop environment. KDE tidies up your desktop and makes it much easier to navigate your way round Linux. To set up KDE as your default GUI, run the script **lastart** which is on our CD. This script also allows you to set up other user accounts, so you don't have to keep logging on to Linux as root.

There's no shortage of alternative GUIs but for the sake of simplicity we recommend KDE

START HERE!

9 How to connect to the Internet

You need to connect to the Net to get the most from Linux. Here's how...

Linux, having been developed by the Internet community, comes with a full set of Internet tools. Even if you don't plan to use the full range, you will definitely want to get online as soon as possible. This is because nearly all support, help, programs, patches and updates are not available anywhere else.

Before you can connect to the Net, you need to be sure your modem works with Linux. Unfortunately, the majority of internal modems bundled with modern computers are 'Winmodems' (or similar – Winmodem is actually a trademarked name for one particular type, but we use it here to describe them all). Winmodems will NOT work under Linux.

Is your modem OK?

Go to www.o2.net/~gromitkc/winmodem.html to see if your modem is compatible. Basically, if you've got an internal modem that came with your computer, though, it is almost certainly a Winmodem. So now what?

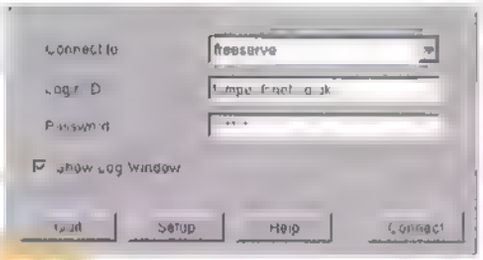
Well, if you need to buy a new modem, your safest bet is an external one. Before buying, ask if the model you settle on works with Linux.

Now that your modem is sorted, let's configure your system to access the Internet.

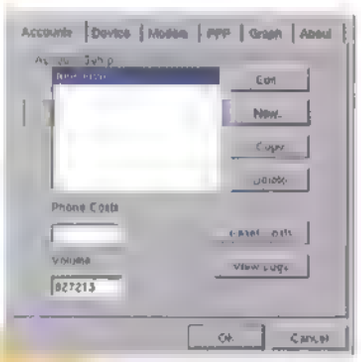
First, you need an Internet service provider (ISP). For the purposes of this tutorial we'll assume you already have an ISP and are already connecting to the Net via Windows. We'll use Freeserve as an example.

WARNING

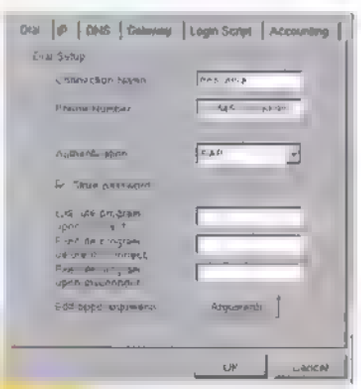
Once you've split your partitions, if you use a program in Windows that affects the MBR, the Master Boot Record, you will lose Linux and have to reinstall. (You will be warned if a program is going to do this.)



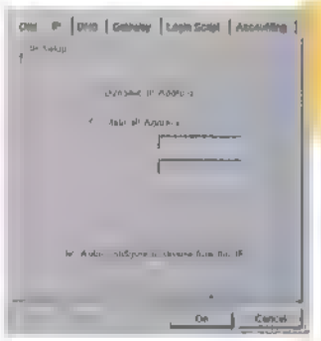
1 When connecting to the Net, you'll be using the dial-up program kppp (you can find it under KDE by clicking the K icon on the toolbar on the bottom-left), and selecting the Internet folder. Running it brings up this box. We've already entered our details. To do the same, click on setup



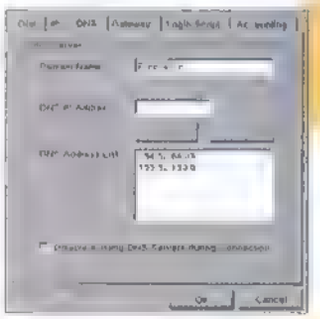
2 Select the Accounts tab and then click on New Now you can enter your Internet service provider's connection details



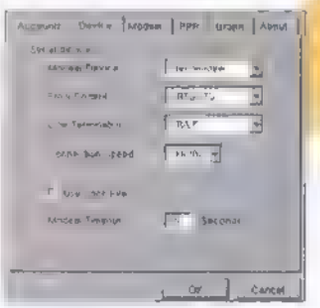
3 Click on the dial tab and enter your ISP's name and connection telephone number (there's a 9 there because we are using our company's internal phone system to connect). Then click OK



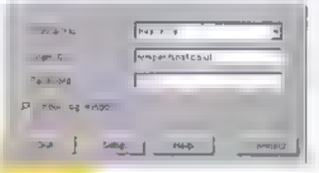
4 Now click the IP tab and make sure your details match these. Then click OK



5 Now enter the ISP name again and your DNS details. Freeserve uses two DNS servers; it's possible your ISP uses less or more. Click OK



6 Click OK and return to the screenshot found in step 3. Click the device tab and select your connection speed. Then click OK



7 Now when you want to connect to your ISP, run kppp and enter your username (in the Login ID field) and your password and click connect. To browse the Web, run Netscape once you have a session opened. (If you find you are having problems running programs after connecting to the Net, run the program first, then connect using kppp.)


Illustration: Vail Rob
REBELS WITH

Meet the new revolutionaries, the people behind Linux. Linus Torvalds, R M Stallman and Eric Raymond tell us why liberating yourself from the grip of giant corporations is the way forward for your PC. **Cotton Ward** reports

What happens when the worlds of Open Source software and commerce collide, and when programmers who give code away come into contact with programmers who sell code for profit?

The question arose when Red Hat sent out at least 1,000 emails to software developers who'd contributed to certain Open Source products, and offered them shares in its upcoming flotation. Unfortunately, these were only available through E-Trade who required a $1000 deposit, and at least $1200 to buy a 100-lot of shares. Needless to say, many hackers couldn't afford this, and missed out.

www.etrade.com

We decided we had to find out more: how did people feel about seeing their freely-donated code appearing in commercial products? Was there any chance of this heralding – even in a small way – the beginning of the end of the Open Source/free software dream? The results surprised us.

We began by posting questions to two newsgroups – comp.os.linux.advocacy and alt.os.linux – to see whether people are happy or disgruntled with Red Hat's IPO and whether they think the company still encourages "Open Source" principles.

> "I think there are a few loud voices that do not appreciate all the good things Red Hat is doing. I guess there will always be anarchists who despise structure and organisation"

Instead of being deluged by hundreds of hacked-off hackers, we only received two responses, from people who hadn't been involved in the IPO at all.

This was encouraging for the Open Source movement, if not our hopes for a lively story. So we asked some of the industry heavyweights what they thought about Red Hat's IPO and the company's influence on Open Source principles instead. First up, of course, is Linus Torvalds, the former Helsinki University student who began developing the Linux kernel in 1991. He used the Free Software Foundation's toolkit while many other Net hackers also contributed to the development of Linux. Torvalds said he scored some shares in Red Hat, but "no, it didn't make me ridiculously wealthy".

In it for the money?

He defends the rights of companies such as Red Hat to exist. "The commercial ventures have been critical to the success of Linux. The reason is that they work in a completely different dimension. The 'hardcore' development that happens on the Internet tends to focus on fundamental problems, performance, and on the technical details. That's not something that most commercial software houses necessarily want to do at all – and you can add a random snide remark about Microsoft here! What the commercial side brings is ease of use, 'polishing', 24x7 (24-hour by 7-day) support contracts, and distribution – all the small details you need to be successful, but which aren't really all that exciting."

He says he's not worried about Red Hat being overly dominant in setting standards. "I think the US is mainly Red Hat-oriented, and many people don't see that Linux is much more than Red Hat. Yes, Red Hat is big, and it'll grow bigger still, but so will a number of other Linux distributors, and nobody really controls the market. And Red Hat doesn't tend to dominate in the Linux Standards Base area - technical and practical issues do. So I don't really see the reason for being all that nervous. One of the points of Open Source is that you can't ever unilaterally control the market, because even the extensions will always be available to others."

www.linuxbase.org/

As to some people's comments that Red Hat is trying to keep other players out of the market, Torvalds says: "I grow rather weary of this line of reasoning." He declined to clarify this point any further.

He points out that the concept of Open Source to Linux users is so important because it "keeps control in the user's court". He adds: "Whatever happens, Open Source means that you can always fix whatever issues

www.opensource.org

WHAT IS OPEN SOURCE?

Open Source is a name given to software developed by programmers, peer-reviewed by other programmers, then distributed for free to anyone who wants it. The code is owned by the Open Source community as a whole and is therefore non-proprietary. The advantage over commercial software development is that code can be written and fixed faster and is often better-written. Open Source-type software has its roots in academia and been around for as long as the modern computer, but many feel that the rise of commercial software concerns, proprietary standards and patents is a threat to the health of computer science. The rise of the Internet has allowed talented programmers to form online cooperatives which are large enough to compete with commercial concerns.

A CAUSE

"You don't win a battle by asking, 'Will we win?' You win it by doing your best to win."

– R M Stallman

REBELS WITH A CAUSE

plague you." What about the various strong personalities, though, who all have to work together?

'Egotistical people doom themselves. If you don't play together with others, you don't get the benefit of co-operation, and you'll end up being just another person in a world where there are hundreds of competitors willing to do better."

Death of a community

Next up, we contacted Richard Stallman who first began working at the MIT Artificial Intelligence Lab in 1971, when sharing software was the norm and everyone pitched in, to improve programs. When proprietary software was introduced, people had to sign non-disclosure agreements saying they would share or change the software.

The last straw was when someone refused to give Stallman and the MIT AI Lab the source code to control the printer, and he decided he never wanted to treat someone else in this way. He left MIT in 1984 to develop a free UNIX-like operating system and founded the Free Software Foundation and developed the GNU General Public Licence (GPL).

"I hope this magazine won't repeat the usual mistakes such as 'Linux is an operating system that was developed in 1991 by Linus Torvalds,'" Stallman points out. "In truth, Linux is a kernel, the operating system as a whole is basically the GNU operating system, which we in the GNU Project started developing in 1984. In 1991 it was almost finished, missing only the kernel. People put it together with Linux to make the combination GNU/Linux, which is the system people use."

"Most users don't realise this, because they typically hear the whole system called 'Linux'. So they don't realise that the GNU Project was the origin of this system, and that our idealism made it happen. I hope you'll give us equal billing by calling the system GNU/Linux. It's an important point."

www.gnu.org/gnu/

He didn't get any shares in Red Hat's IPO. "What happened with Red Hat shares is a side issue of a side issue. What Red Hat does with a small fraction of its stock won't make a major difference to our community's future. The most important question about Red Hat is, will it contribute to building the free software community or weaken it?

> "We're already ahead of Microsoft in everything but marketing. I don't think they'll be able to catch up with us, even if they go open

"So far it has done a substantial amount to help build the community by hiring people to develop free software. But it has also done things that weaken the community, such as including non-free software, in varying amounts, on most of its CDs."

Stallman continued: "Red Hat is just one of many companies that will affect our community. How much companies help build our community, and how much they weaken it, will depend on what we are prepared to accept from them. It will depend on our values. How much do we want freedom, and how much are we willing to give it up for other things such as convenience? And when companies market non-free software to us, will we reward them with our custom or deny them success?"

Stallman points out he has declined to join the Open Source movement. "This was because it only talks about strictly practical values, such as convenience and reliability, and studiously avoids raising deeper issues, such as freedom and principle. That makes its philosophy painless and easy to sell. I think freedom and values are important, and should not be hushed up. I belong to the Free Software movement, where we encourage people to think about those issues.

> "Egotistical people doom themselves. If you don't play together with others, you don't get the benefit of co-operation

"The Open Source people have a right to promote their views, but the Free Software movement, which launched the system people call 'Linux', is still here, and the two movements are different."

The patent crisis

The biggest current threat to the Free Software movement are software patents. If you start getting patent infringement lawsuits for including a "Save as" command or using different colours to show different items, you'd never be able to afford the legal defence costs. "The battle is just beginning, and it will take time," Stallman says. "You don't win a battle by asking, 'Will we win?' You win by doing your best to win. Good citizenship means taking the side you think is right, not the side you think will win."

He says it's important for UK Linux users to lobby against trivial and broad software patents being introduced here. "Most countries have their own independent patent systems, so the issue is usually decided on a country-by-country basis. A solution in the UK has to come from people in the UK." He recommends supporting the European-oriented Free Patents Web site

"I advocate legally exempting, from patent infringement claims, the use of software installed or installable by the user on general-purpose computer hardware, when the hardware itself does not infringe, and the idea that is patented is in nature a matter of computation or processing." He says we also can promote the issue of free software by "discussing it". "The more you talk about it, the more you show people that it can and should be done."

www.freepatents.org

Enter Eric Raymond

Meanwhile, high-profile Internet developer and writer Eric Raymond says his research has helped explain the decentralised Open Source model of software development. His own projects include one of the Internet's most widely-used email transport

www.tuxedo.org/~esr

GIVING IT ALL AWAY

People and companies who've decided to give away their software

JANUARY 1998
Netscape releases the Communicator 5 browser on its Mozilla.org Open Source project. Few people were able to get through the 17 million lines of code and no major third-party products have been developed. Read Jamie Zawinski's resignation from Netscape at www.jwz.org/gruntle/nomo.html

JUNE 1998
IBM 'buys' Apache software from a group of 20 programmers, who insist the source code remains freely available. In return, IBM agrees to share hacks with Apache.

SEPTEMBER 1999
Sun gives away StarOffice Suite for free. It's a fully-functional office suite which competes against Microsoft Office.

programs, and his essay 'The Cathedral and the Bazaar' inspired Netscape to make its source code freely available.

He's also renowned for getting hold of and annotating two internal Microsoft white papers on the company's attitude towards Open Source software, which are referred to as the 'Halloween Documents'.

Commerce is cool

Eric managed to snaffle a few Red Hat shares after "getting through the maze of idiotic SEC requirements" but pointed out that generally he gives his software away "in the knowledge that outfits like Red Hat might use it to make money". He adds: "I'm cool with that notion." Raymond also co-founded the Open Source Software Group because of concern that the Free Software Foundation's anti-business undertones were hindering the spread of the message.

However, the two groups happily coexist. "The open-source community needs healthy distribution companies, such as Red Hat, with strong capitalisation and Wall Street's respect, to accomplish what we're really after – replacing the present software infrastructure with one that doesn't suck.

"I think there has been a lot of smoke blown about Red Hat setting standards unilaterally, but very little fire. As long as they're not even trying to stop outfits like CheapBytes from reselling their distribution for $1 a pop, there isn't any problem with market domination."

Breaking monopolies

He says the concept of Open Source is important to "anyone who never wants to see a Blue Screen of Death again. Open Source has turned out to be the only way to produce reliable, high-quality software consistently. It's the only way to produce software that evolves fast enough to stay current in Internet time. Also, Open Source puts the power where it belongs – in the hands of individuals and software users, rather than corporate monopolies and software vendors".

He doesn't think Microsoft will ever release any Windows code. "I doubt it, and I don't think it matters much. We're already ahead of Microsoft in everything but marketing. I don't think it'll be able to catch up with us, even if it goes open."

From the other side of the fence, we spoke to Cygnus Solutions' co-founder Michael Tiemann. Cygnus is the largest Open Source-based company and started trading in 1989. Its biggest-selling product is the GNUPro Developer's Kit.

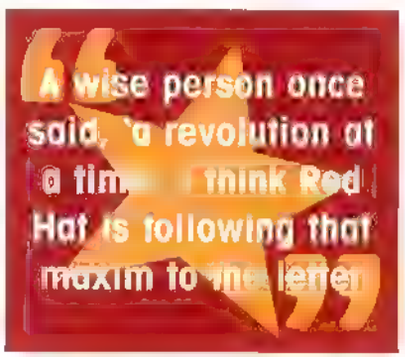
www.cygnus.com

Tiemann told *Linux Answers*: "The reason there is so much Open Source software available today is because motivated programmers have access to world-class development tools that are being continuously improved and supported by Cygnus."

"I'll note that Cygnus is not the exclusive maintainer of the GNU tools, but we contribute the majority of the work in all areas: ports to new microprocessors, features, optimisations and bug-fixes.

"Linus Torvalds has written about the importance of the GNU compiler. What he basically says is that the portability of the kernel is not due to any particular intelligence on his part, but due to the awesome capabilities of the GNU compiler. Compilers and development tools are not sexy in the way that operating systems are sexy, but they are every bit as important to getting apps to market."

Tiemann admits his name is "all over" the GNU C++ source code and he continues to submit bug-fixes to GCC, G++ and GDB, but he hasn't "done any actual Linux kernel work", so didn't get any Red Hat shares. "I believe they scanned only Linux kernel sources to find 'friends of Red Hat'," he speculates.



He disagrees that people who contributed to the development of Linux should have been given shares without having to pay cash upfront. "This would probably violate tax and securities laws in some countries. I think Red Hat did the right thing by using existing mechanisms. A wise person once said 'one revolution at a time'; I think Red Hat is following this maxim to the letter."

Positive reactions

He continues: "There are definitely people who resent the fact that Cygnus doesn't do more for them for free, as we are actually quite expensive to hire, but I think that's their problem."

As for Red Hat's detractors, Tiemann remarks: "I think there are a few loud voices that do not appreciate all the good things Red Hat is doing. I guess there will always be anarchists who despise structure and organisation.

"Cygnus has drawn far less flack than Red Hat but, then, we are a lower-profile company. I hope that some day we will be profitable enough to do some amount of community-oriented work. I really wish I had $100bn to give to charity."

As for the likelihood of Microsoft ever releasing any Windows code, Tiemann says the chances are pretty remote. "I consider it as likely as a 9.8 earthquake destroying all of San Francisco. If it happens, it happens, and there's not much that can be done. Incidentally, I don't live in San Francisco."

THOSE KEY PLAYERS

Linus Torvalds is the creator of the Linux kernel (that is, the code that sits at the heart of Linux and controls most of the basic processes). He started work in 1991 under the aegis of the GNU software project whose founder was...

... R M Stallman. His GNU manifesto, created in 1984, helped kick-start the Open Source movement. An aim was to develop a universal operating system which was not owned by any commercial concern and could be adapted by anyone who wanted to. GNU/Linux was the result.

GNU/Linux is the full title for Linux, although in the interests of readability we have shortened the title to Linux elsewhere in the magazine.

Eric Raymond is a well-known Open Source programmer and advocate whose writings have helped influence a number of commercial concerns to adopt the Open Source model of development. His key work 'The Cathedral and the Bazaar' is being published by O'Reilly around about now.

Linux PC

PC World Advent 8707

PC World has made the first steps of providing a Linux PC for the masses, but what does it offer over a more traditional machine?

The largest problem PC World would have faced when putting this machine together would have been getting hardware to work, because so far hardware hasn't been designed with Linux in mind. This means Linux drivers either don't exist or are unstable. There are two answers to this – ship with the latest hardware and expect lots of angry phone calls or ship hardware that's known to work, as PC World has done here.

The first evidence of this is the graphics card – an aged AGP Xpert98 Rage Pro from ATI. The 8Mb of onboard memory does allow X Windows to run at up to 1,600 x 1,200 in 32 bit colour, but apart from that there's little to get excited about. You would need a high-quality monitor to display this resolution and unfortunately the Advent 8707 doesn't come with one. The highest supported resolution we managed to get X Windows booting in was 1,152 x 864 at 32-bit, and even at this speed there was noticeable slowness with refreshing the screen.

The 17-inch Philips 107E monitor has a recommended display of 1,024 x 768, although it should support up to 1,280 x 1,024 at 60Hz. Four buttons control image quality, brightness and contrast settings. The image quality is acceptable, lacking the crispness of a professional monitor, but is well in line with monitors supplied with new PCs.

The other sign that the hardware has been carefully selected to be compatible is the ISA based modem. This is a 56K device, but because it sits on the ISA bus, the transfer rate between the modem and the rest of the system is a little wanting. PC World is going to replace this modem with a PCI version later this autumn.

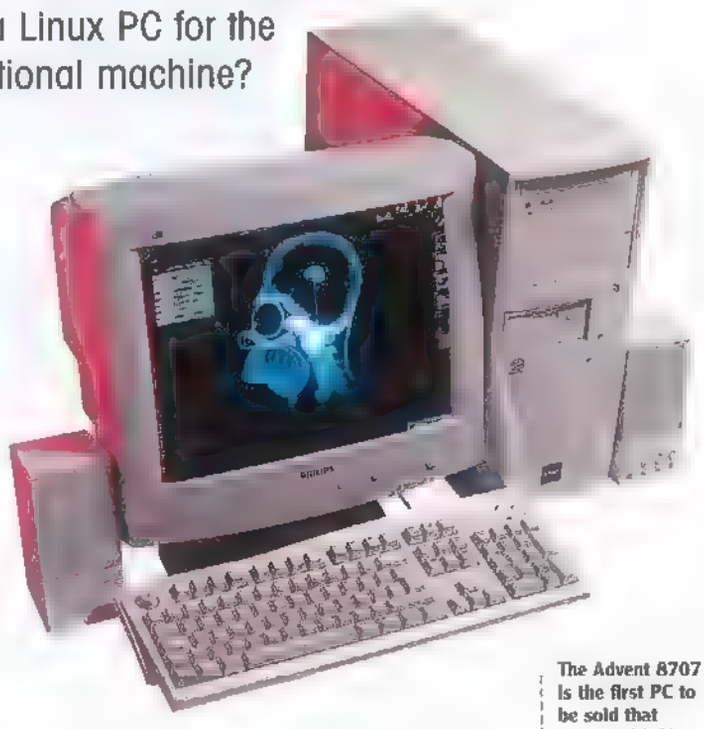
The SoundBlaster 64 Value soundcard, although not cutting edge, should provide you with enough sonic pleasure. It is also in the wonderful position of being a compatible standard – causing the least amount of problems when it comes to sound under Linux.

Specifications

HARDWARE: Intel Pentium III 450MHz, 64Mb RAM, 100MHz SDRAM, Philips 17-inch 107E, 6.4Gb Ultra ATA/33, 8Mb ATI Xpert98 Rage Pro, SoundBlaster 64 Value, Creative Speakers, 40X ATAPI CD-ROM drive
LINUX DISTRIBUTION: Linux-Mandrake v6.0 Deluxe
SOFTWARE: StarOffice 5.1, X Windows Server v3.3.3.1, GNOME 1.0/Enlightenment, KDE v1.1.1, WINE Windows emulator, 3 Linux books in PDF

Well proportioned

The neatly proportioned tower with subtle styling has three 5.25-inch drive bays and two 3.5-inch slots. One of each type is used by default. The 40x CD-ROM drive occupies the top of the tower and the standard floppy drive takes up one of the smaller bays. This leaves plenty of room for a CD-Writer and a backup device should either be needed. Open the case and you'll find that the space is well-organised with plenty of upgrade potential. The 6.4Gb Ultra-ATA hard drive sits under the 3.5-inch bay slots with room for an extra hard drive above it, although we would have been happier to see at least a 10Gb drive used.



The Advent 8707 is the first PC to be sold that comes with Linux pre-installed. Unfortunately it also comes with a hefty price-tag...

The BX motherboard is from the well-respected Gigabyte, so there should be little incompatibility problems with the main chipset. Expansion-wise there are three free PCI slots and one free ISA slot.

Software-wise you get a copy of Linux Mandrake 6.0 Deluxe, which is set up to boot straight into KDE (GNOME and Enlightenment are provided, too). Everything in KDE is set up well and we had few problems on this front, although the modem wasn't set up optimally. You get a copy of StarOffice 5.1 with Mandrake, although this isn't installed by default. PC World is also intending to supply Quake II Colossus.

For a one-stop solution, this is an ideal, if slightly expensive, way of getting a Linux machine.

Alan Dexter

MANUFACTURER: PC World
WEB: www.pcworld.co.uk
DISTRIBUTOR: PC World
CONTACT: 0990 464464
PRICE: £938 Inc VAT, £798.30 exc VAT

LINUX ANSWERS RATINGS

Performance	
Features	
Value for money	
OVERALL:	

Office suite

ApplixWare for Linux v4.42

Linux needs a great application suite – is this the answer to our problems? Well-known UNIX developer Applix reckons so…

Many of the companies that distribute Linux (such as RedHat, Caldera and Corel) are making strong efforts to extend its reach to the desktop market. To be able to make this transition, it is vital that there are plenty of useful applications.

The current front runners are StarOffice and Corel Office (due for release early next year). And now comes Applix. Applix has a strong tradition on UNIX machines for producing low-cost, high-quality applications. Its release of ApplixWare for Linux brings it into the competition for the market. The preview version we've seen consists of a word processor, spreadsheet, email client, presentation creator, database querying tool and the "Builder" visual object-oriented programming application – there is just about everything you will need to handle office-related procedures, all available from a single starting point.

> **You can share documents in a common format across multiple platforms without endless conversions**

From the moment you start using ApplixWare, you'll notice the integration of the different components of the suite. For example, you can embed any documents created with any of the components into a document in another. This integration is supported further with the availability of ApplixWare for Windows, so that you can share documents in a common format across multiple platforms.

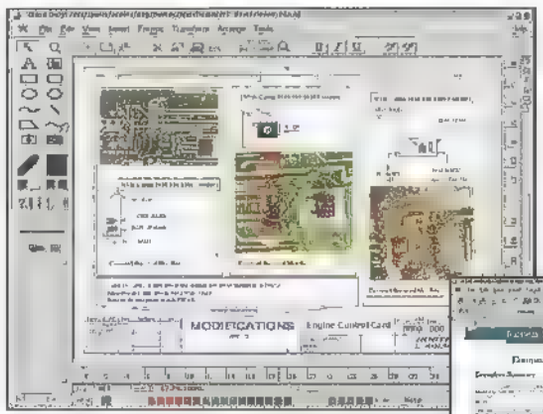
A major gripe in this area is that many of the buttons in the application toolbars are not labelled (ie they don't say what they do). There are small pictures that give an idea of what they do, but beyond that you have to refer to the documentation to keep track of which buttons are which.

Words and pictures

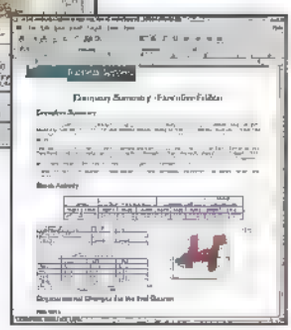
'Words', the word processor contains just about every feature you are likely to need. It is fully WYSIWYG with a well-chosen selection of fonts. The usual spell checking and thesaurus tools are present, as are tables and a myriad other features. Printing is something that both Linux and the UNIX in general have never quite grasped but you'll be fine if you own a PostScript printer.

'Graphics' is a structured drawing application that allows you to create complex diagrams and illustrations with ease, which can be easily resized without any loss of quality.

If you are familiar with a powerful office suite, you will instantly recognise most, if not all, these features and will do the same with the spreadsheet and presentation applications. The real power of ApplixWare, though, comes from 'Builder', a system that lets you create your own custom applications based on a number of supplied objects and simple scripting. This has profound implications for a business environment where you need database-driven, real time apps running across multiple platforms, but retaining common file formats and interface styles.



Complex technical diagrams are a breeze and they can be enhanced with normal pictures



The ability to embed objects from one program within another will enhance your documents and presentations

The database querying tool in ApplixWare and the suite's ability to update data in real time means that this is simply a matter of linking objects together and writing some code to move the data around.

Unfortunately, not every component piece of software is as good as each other, specifically the mail client. It has all the features you would normally expect from a mail client as well as several other useful additions – for example, if someone sends you an ApplixWare document as an attachment, it can automatically display it for you – but it has a highly unfriendly interface.

While it may be aimed at business users, ApplixWare would suit a home user, too. Unlike Sun's StarOffice and many of the other office suites available or planned for Linux, ApplixWare is not free – it is available from Applix via its Web store for $99.

Chris Jones

MANUFACTURER: ApplixWare
DOWNLOAD FROM: www.applix.com
DISTRIBUTOR: Applix
PRICE: $99

LINUX ANSWERS RATINGS

Performance	
Features	
Value for money	
OVERALL:	

Linux distribution

Definite Linux 7

It's the first Linux boxed-set built and produced in the UK, with support to match. Will it put UK Linux developers on the map?

With the current interest in non-Windows operating systems and the huge upsurge of interest in Linux in general, we've seen our favourite OS move from a propeller-head minority interest to become a mass-market product for all of us.

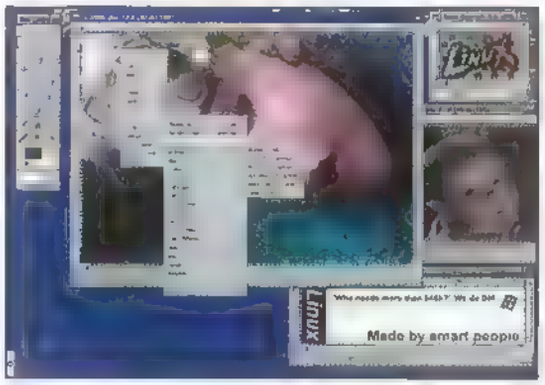
One of the biggest factors in this transition has to be the boxed versions of Linux you can buy in any major PC shop. There are lots available, with distributions from Red Hat, SuSE, Caldera and Macmillan all vying for shelf space next to Windows.

All come with hefty manuals that ease you through the installation and configuration of your new Linux box, and all include something revolutionary for Linux – free technical support for if you get stuck. The fly in the ointment is that this support usually involves either calling another country or using email - no Linux boxed set comes with genuine UK support.

Until now, that is...

Definite Linux is based around the popular Red Hat 6 distribution with tweaks and enhancements – more on this later. It's been around for a while in the form of a CD-only distribution, and becomes a true mass-market product with the arrival of this fully boxed version of Definite Linux 7. There are two packages available - the standard edition, which we're looking at here, and the Advanced Server Edition priced at £150.

Installation is as easy - or as awkward – as Red Hat 6. The Red Hat base has a very long list of supported kit, and Definite Linux expands on that to include even more. There's still no direct support for USB or more recent developments such as DVD RAM, but this is owing to the state of development of the Linux kernel itself rather than a deficiency in Definite Linux. As a desktop OS, Linux has come a long way in recent months. Gone are the days of spending most of your time at the textconsole – in common with all modern Linuxes, Definite installs the most recent XFree86 server, along with efficient and visually pleasing interfaces like GNOME and KDE.



Definite Linux brings out the GIMP in you

A wonderful workstation environment it may be, but Definite very much excels when put into use as a server. If you're looking for a file, print or even Internet server for a PC or mixed Mac/PC network, Definite is up to the job. Linux is a fast, robust OS to begin with, and Definite's enhancements have done nothing to impact on that superb stability.

Disk RAID

Definite runs around the 2.2.12 release of the Linux kernel, the most recent stable release version as we went to press. It include patches to improve speed and support for hardware aimed at the server market, including RAID hardware controllers for large disk arrays. Also included is direct support for ISDN, something missed by almost every rival distribution.

With rivals like SuSE offering six CDs full of applications, you have to look carefully at what you want. If you're after a robust system backed by strong UK support at a price cheaper than Red Hat, then there really isn't any other option

Frank Charlton

Definite Linux comes with every Internet tool you'll ever need, including Netscape Navigator 4.61

MANUFACTURER: Definite Software
WEB: www.definitelinux.com
CONTACT: 0161 4774235
PRICE: £39.99 inc VAT

LINUX ANSWERS RATINGS

Performance	
Features	
Value for money	
OVERALL:	

Shoot-'em-up

Quake Mission Pack

Quake needs no introduction. It's the meanest, most ass-kicking, blood-letting nuke-'em-up ever made. But has it managed to convert to Linux with its style intact?

While the entire world is touting Linux as the next generation OS for serious work, a lot of us like to relax after hours with a quick session of rampant annihilation. A lot of people would have you believe that Linux can't play games, unless you count the numberless versions of solitaire and Tetris which seem to come with every Linux distribution. Ha, wrong, wrong, wrong.

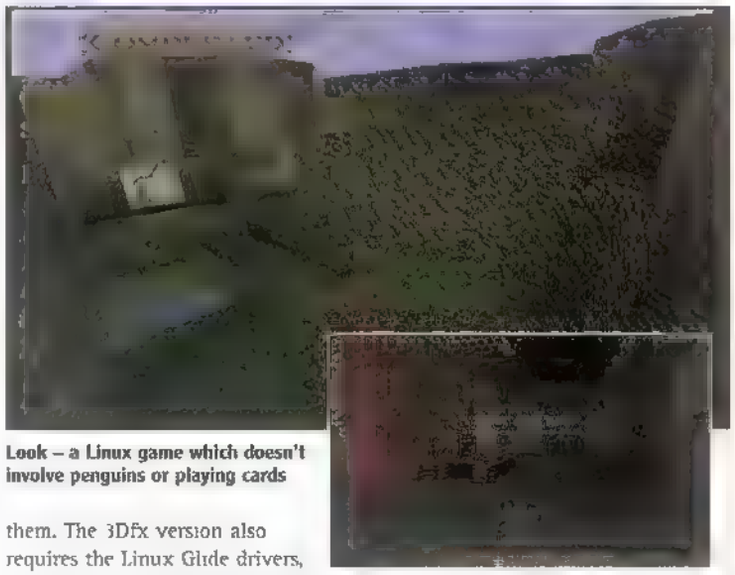
Not only can you play full-screen games with 3D acceleration, you can get to grips with commercial titles such as the new Kingpin and Civilization: Call To Power. More and more game developers are porting their titles to Linux, and Macmillan has released the game which kickstarted the first-person 3D shooter market – Quake.

A huge box reveals a single CD and two small manuals lurking within. As well as the full version of the original Quake, Macmillan provide two full mission packs, both of which were originally sold as extras for the Windows version – Scourge of Armagon and Dissolution of Eternity. For the price, that's a serious amount of quality gaming.

"Kill them all!"

To run Quake under Linux, you'll need a P100 or greater with at least 16MB of memory and a soundcard which is 100% SoundBlaster compatible. You'll also need between 54 and 130Mb of diskspace, depending on whether you install both mission packs or not. A 3D accelerator card isn't needed, although Quake will run with a 3Dfx-based card if you have one – Voodoo 1, 2 or 3 and both Voodoo Rush and Banshee are supported. Installing isn't difficult, since Macmillan provides a simple script to unpack and copy the files to the correct location. Great stuff.

The game comes in three versions – the standard Quake which runs full-screen from a console and uses a software rendering system, an X11 version which runs in a window using the Mesa 3D libraries, and an enhanced Mesa version which renders via a 3Dfx card. You'll need to have SVGALib installed to use the first, and the second two require the Mesa 3D libraries – none of these are supplied with Quake, so you'll need to chase them up if you don't already have them. The 3Dfx version also requires the Linux Glide drivers, and they aren't supplied either. Again, a trip to the Net to download the latest versions is needed – at least the manual does tell you where to go. Luckily, we had both Mesa and the Glide drivers installed on our system, but it irks us that Macmillan choose not to supply them in any way – even older versions would get you started.



Look – a Linux game which doesn't involve penguins or playing cards

In play, Quake was very smooth, with the software render engine providing slightly better performance than the one supplied with Quake for Windows. We had no problems installing and playing either of the mission packs, and the game ran without hassle – excepting the fact that forcing it to quit with CTRL-C often left us with a black screen and no way to recover other than a reboot. Quake may not be state of the art, but until we see the likes of Half-Life for Linux, this'll do nicely, thank you.

Frank Charlton

Linux vs Windows

If you've played the DOS and Windows versions of Quake, chances are you'll want to know what the differences are between those and the Linux version. In a word, none – not in gameplay terms, anyway. At this stage in the development of Linux, it isn't as easy as Windows to play games under. Windows has advantages like DirectX, which enable developers to produce games without worrying about details like sound and video drivers like they had to in the DOS days. As we've already said, Linux Quake suffers from clunky installation and some awkward configuration issues. Once you get past that, the versions are virtually identical – Linux Quake even uses the same data files as the Windows version.

Quake for free!

If you've already spent money on the Windows version of Quake, do you have to fork out to play it under Linux? Nope – you can download the necessary patches and applications, and use them together with your Windows Quake CD. Fire up your Net connection and surf to www.linuxgames.com/quake/ for details and some excellent instructions on how to install and configure Quake for Linux.

ORIGINATOR: id Software
DISTRIBUTOR: Macmillan
DOWNLOAD: www.qualityimage.com
PRICE: free

LINUX ANSWERS RATINGS

Performance	
Graphics	
Gameplay	
OVERALL:	

Freeware

The best new freebies

Not enough software jewels in your Linux crown? Get your mitts on this little load of downloadable sparklers, says **Frank Charlton**

A lot of the pro-Windows crowd will tell you that the main failure of Linux is that there just isn't a big enough selection of applications available for the platform and that Windows has it all. Er, rubbish.

Linux has programs available by the thousand, and the big plus is that most of them are free. Yes, free – after your download costs, you can use them for absolutely nothing.

Whatever task you have in front of you, there's a Linux program to do it. Over the next two pages we're taking a look at some of the more esoteric ones which caught the big, beady *Linux Answers* eye...

BLUEFISH

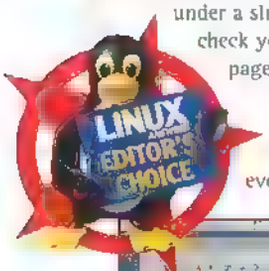
Function: HTML editor

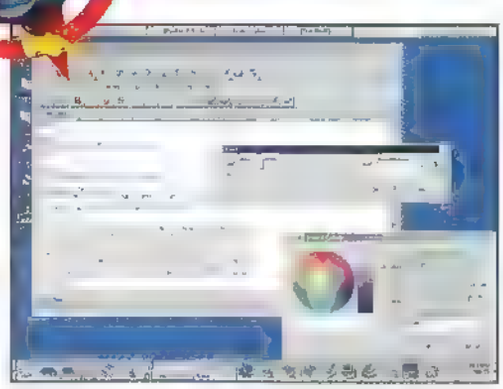
Download: http://bluefish.linuxbox.com

Hardened Webmasters like to write HTML by hand – none of these overloaded, wizard-driven, hand-holding FrontPage packages here, thank you. Writing pure HTML gives the highest level of control over how a page looks, and it's not as difficult as you might have been led to believe.

You can write HTML with any text editor, but a pure editor designed for the purpose is way better – and Bluefish is such a beast. It's a very cool-looking app, and provides an excellent way to develop Web content. Everything you'd expect to see is here, all controlled under a slick dialog-driven interface. You can check your code with Weblint and preview pages in Netscape with single clicks.

Of all the Web development packages we've seen so far under Linux, Bluefish is the smartest – and it's not even finished yet.





Bluefish is an integrated Web development environment for HTML authors, and it's very slick indeed

XRN

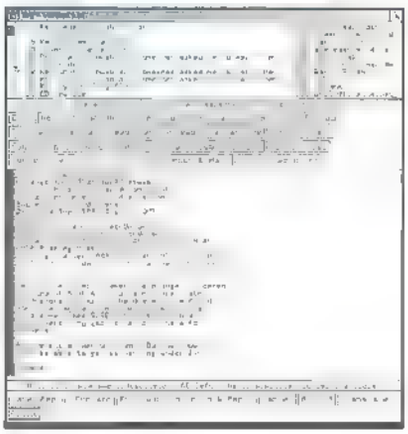
Function: Internet news reader

Download: www.mit.edu/people/jik/software/xrn.html

Usenet news may not be as popular as it once was, thanks to the Web explosion, but it is still a superb way to learn about and discuss any topic under the sun from thousands of newsgroups.

To participate, you will need a reader, which is where XRN comes in – it enables you to download, read and reply to news postings all via a straightforward graphical interface.

Sadly, the look and feel is very dated, harking back to the most basic X applications. It's a capable tool, but the old-style look and feel will put anyone used to modern Linux apps off right from the start. There are better alternatives, including the news readers supplied with Netscape and KDE.



XRN is a competent news reader, but suffers badly from an old-school X interface

DISKDRAKE

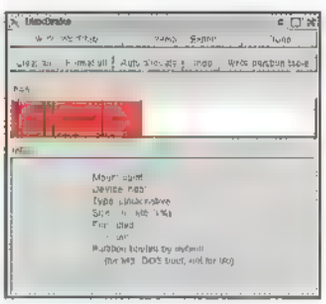
Function: disk partitioning tool

Download: www.linux-mandrake.com/diskdrake/

Working with hard disk partitions is never an easy task, and one slip can send you right up the creek without a paddle. Windows users have it easy, thanks to commercial products like PartitionMagic, but Linux users have to make do with some pretty arcane text-based console programs.

Linux vendor MandrakeSoft wants to rectify the imbalance, and DiskDrake is the result – a fully graphical partition editing tool. It's still very much a work-in-progress, but is potentially very powerful.

DiskDrake can create, delete and format partitions, and can also change the partition type. It can resize Windows FAT partitions, but can't do the same for Linux filesystems unless you don't mind complete data loss – a shame. Still, it's early days yet, although you might want to wait for the final release version.



Be very careful – in the wrong hands, DiskDrake can destroy entire disk partitions very easily

SOFTWARE HOT LIST

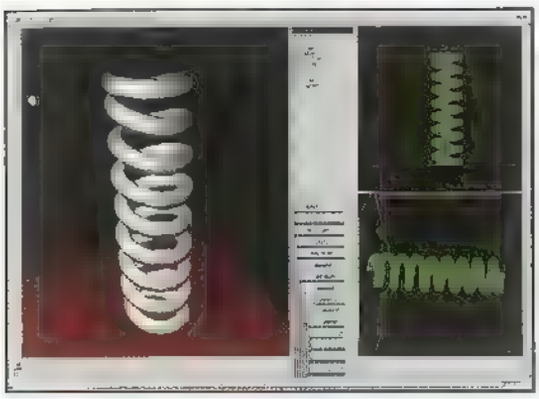
3DOM

Function: solid 3D modeller

Download: ftp://ftp.cs.kuleuven.ac.be/pub/graphics/software/3dom/

If you're serious about solid 3D modelling, 3DOM could be worth a look – but beware the steep learning curve

To get to grips with 3D imagery and animation, the first tool you need is a modeller – the program that enables you to construct virtual models in 3D space. If you've played with or seen Windows modelling software like trueSpace or 3D Studio, you'll probably be disappointed with 3dom – it's one of the most cryptic and awkward pieces of 3D software we've used. To be fair, it's not aimed at casual dabblers in 3D, and is much more a technical or CAD type of package – the documentation mentions that 3DOM development is now geared towards it being used for 'global illumination' calculations.



3dom is only available as source code and relies on the Qt libraries being present on your system, along with the OpenGL 3D graphics extension. It was an absolute pig to compile on our system, continually reporting that our copy of gcc couldn't compile executables.

DOTFILE GENERATOR

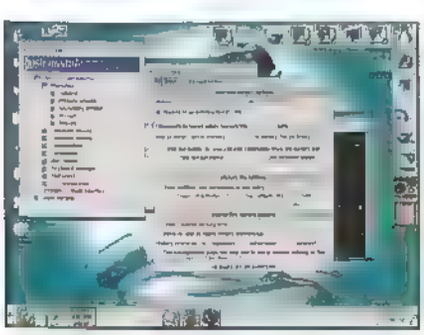
Function: application configuration tool

Download: www.lmada.ou.dk/blackie/dotfile/

If you've ever had to wade through an application's config file by hand, you'll love Dotfile Generator

Windows uses the Registry, MacOS the Preferences Folder, and Linux dotfiles – for storing configuration data for individual applications, that is. Dotfiles, so-called because they're hidden from general view by beginning the filename with a full-stop, don't generally follow any specific syntax and can be hard to fathom out.

Dotfile Generator is a neat program which supports popular Linux apps such as Emacs, the Bash shell, Procmail and more, and provides a graphical way to tweak and edit each program's configuration. You still need to know what you're doing as there's not much help, but it's a lot easier than fiddling with a text editor.

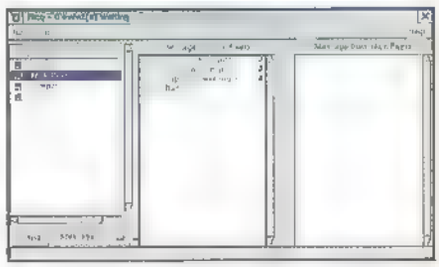


This is a very handy program to have tucked away

NICQ

Function: Internet messaging and chat

Download: http://nicq.learnrespect.org/



It ain't very pretty and, sadly, NICQ isn't all that functional for more than basic massaging

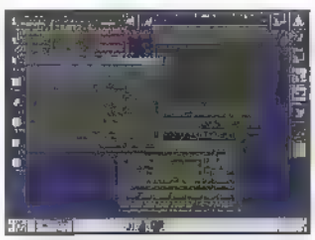
KCQ from Mirabilis is one of the hottest 'instant messaging' applications for Windows users, and a number of authors have created compatible clients for Linux. One of the latest is NICQ, which wants to make life easier by performing every function from a single window. It works nicely, too – within limits.

While NICQ performs the basic ICQ tasks, it can't do stuff like direct file transfers. Worst of all, it doesn't provide any way to sign up with the ICQ network, and expects you to have a user ID and password already. Other Linux clients can do it, so why can't NICQ? With better clients available, there's little to recommend this

MP3 STUDIO

Function: MP3 creation suite

Download: http://hensa.linuxberg.com/x11html/mul_mp3.html



Get involved with the MP3 action with MP3 Studio, a full creation solution for Linux

Unless you live in a sensory deprivation tank or just got back from Mars, you'll know what an MP3 is – a tightly compressed, almost CD-quality format for storing digital audio, which has taken the world by storm.

MP3 Studio gathers together lots of individual resources to create a suite for MP3 creation, playing and management. There's a 'ripper' to extract the digital audio from CD without quality loss, encoders and decoders to convert to and from MP3, a playlist manager, an MP3 player and more, all controlled via a graphical front-end. You can pick up the individual apps separately, but using MP3 Studio is far easier than fiddling with command-line options. It all works nicely, and provides a true integrated MP3 solution.

LINUX ANSWERS RATINGS

BLUEFISH	4
XRN	2
DISKDRAKE	3
3DOM	2
DOTFILE GENERATOR	4
NICQ	1
MP3 STUDIO	4

For more free Linux software, take a trip to ftp://sunsite.unc.edu/pub/linux/

Further reading

Linux Device Drivers

There are many books devoted to Linux but can they keep pace with its development?

The big advantage of the Open Source licence is that you can make your own changes and customisations to the Linux source code. This is particularly useful for developing drivers for pieces of your hardware that don't have drivers available (or have drivers that aren't complete).

Documentation is an area that Linux has often been criticised on, especially for coverage of low-level kernel work, as there are times when the only way to work out how a particular feature works is to read the source code itself. While this might reflect badly on Linux, the only people who are likely to be working at this level are probably going to understand the source code anyway. That said, if you are writing drivers, you will be using a much higher level API provided by the kernel, which is well documented.

A good read

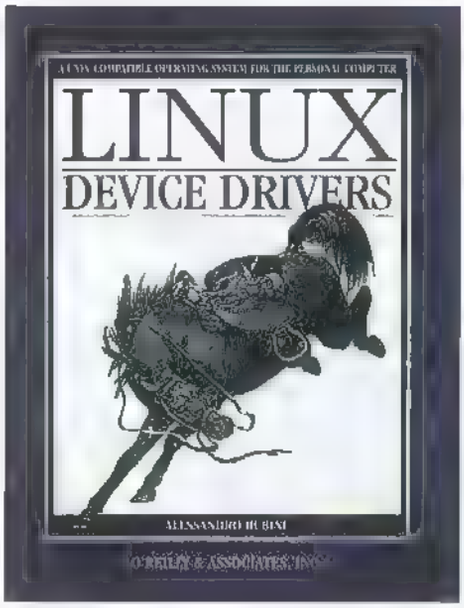
O'Reilly has been consistent in providing some of the best books that cover Linux related topics and *Linux Device Drivers* is no different. Aimed at people with knowledge of the C programming language and basic knowledge of the various system functions provided by a UNIX like operating system, it walks you through all the different concepts you will need to know to be able to write drivers, starting at the basics with an example that does nothing more than print the text 'Hello World' to the system console.

> "As new concepts are introduced, they are explained with the aid of sample code"

The book is divided well, with each chapter covering a distinct area in a suitable level of detail. Topics covered include 'char' drivers, which are used with devices that Linux sees as a file (eg parallel ports), 'block' drivers, which are usually related to storage devices, network drivers, memory allocation, interrupt handling and many others.

As new concepts are introduced, they are explained with the aid of sample code (available from O'Reilly's Web site at no extra cost) that shows the concept in action. There is also a complete example driver that drives a simple device you can build yourself and attach to your parallel port. It doesn't do anything useful, but it gives you a clear idea of what would be needed for a real piece of hardware.

The only problem with the book is its age (it was first published in February 1998). While it may not be old by book standards, the computing world is ever changing. So, unless documentation is kept up to date it can become next to useless in a matter of months. At the time the book was written, the 2.0 series of kernels was in use and the 2.1 series was in development (2.1.43 being the latest development kernel mentioned in the book), but Linux has now progressed to the 2.2 series (with 2.3 under heavy development for the 2.4 release expected in the New Year). The difference between the 2.0 series and 2.2 is substantial and most old drivers have to be at least modified, if not completely rewritten, before they will work properly with the latest kernels.



This book has well-detailed coverage of Linux drivers but, although only 18 months old, it's already showing signs of its age...

The author was clearly aware of this and there is a chapter devoted to the changes between the two kernel series, which should prove useful, but the majority of the book is still aimed at the older kernels. The official Linux Kernel mailing list has publicly available archives which contain information on porting 2.0 drivers to the most recent kernels.

This book is considered by many of the main Linux programmers to be the best resource for people new to writing Linux drivers (it was technically reviewed before publishing by such luminaries as Alan Cox and Miguel De Icaza) and the author is well versed in the subject (having worked with Linux since its creation).

Chris Jones

AUTHOR: Alessandro Rubini
PUBLISHER: O'Reilly
ISBN: 1-56592-292-1
CONTACT: www.oreilly.co.uk
PRICE: £19.99

LINUX ANSWERS RATINGS

Readability	4
Coverage	4
Value for money	3
OVERALL:	4

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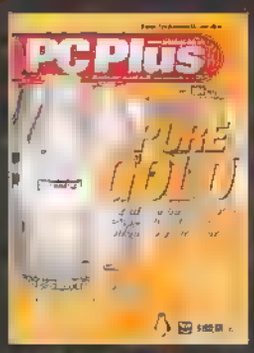

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Six of the best Linux versions are put through their paces

Coderoom superstars

There are amateur Linux versions, professional ones, easy ones, hard ones, big ones, small ones... argh! **Steve Patient** explains how to choose the right Linux for you

A well crafted Linux distribution is a thing of beauty. Each one contains thousands of programs and scripts, automated installation routines, configuration and maintenance utilities, as well as a set of Linux productivity programs and libraries guaranteed to work together.

Along with the Open Source GNU programs, which make up most of any Linux distribution (aka distro), a boxed version usually includes free and demo versions of Linux software, documentation, a help system, a paper manual and a boot floppy. It's a load and go solution.

In practice, there aren't as many original distros as there appear. The Open Source licence allows repackaging and reselling, which means many distros are based on others.

A reworked distro is not the same as a cheap knock-off copy on a couple of good discs: reworking can add value, knock off copies disparage the dedicated work of many people.

Quality and width

Most programs in a Linux distro are released under the GNU GPL (General Public Licence) which requires source code to be made available. Generally, single-CD solutions are binaries – compiled Linux programs designed to run on Intel processors and clones. A distro with two

Coderoom superstars

or more CDs usually includes source code. Linux doesn't need the source to run, but you do need source to recompile new kernels, for example, and often to compile programs distributed only in source form. Having the source locally available makes life simpler, even if you never look at a line of code.

Linux has no mechanism for cleanly installing, upgrading and uninstalling programs, but there are a variety of program packaging formats that enable you to do this. Of these, one of the best, and the de facto standard, is RPM, the format of the Red Hat package manager It's also becoming the standard way to distribute new Linux programs on the Net.

Most distros now support the RPM format because it enables you to install, upgrade and uninstall Linux programs distributed in either binary or source form.

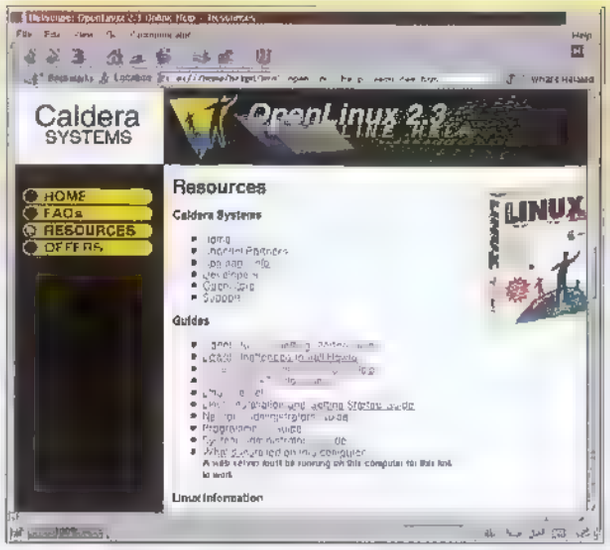
Hardware Issues

Few hardware manufacturers supply Linux drivers for peripherals yet. Despite this, Linux supports a huge range of hardware but lags behind new releases. Most of the drivers are free, although there are several commercial Linux driver vendors.

In general, hardware support is more or less independent of the distro you choose. Later versions of XFree86 support more video cards; later kernels support more hardware and file systems.

Multimedia is also an issue A free sound driver library supports the most common ISA sound cards. www.4front-tech.com/ SuSE includes a licensed version of 4Front's sound drivers, which supports almost all ISA sound cards, but for PCI sound cards you'll have to buy 4Front's commercial sound library.

These and other hardware issues make it worth comparing the hardware compatibility list of the Linux distro against your machine specs before buying.



All good Linux distributions have a help system or two built in, but Caldera's OpenLinux 2.3 has an unusually good Web-based local help system

If you're a desktop PC user and want a graphical front-end, you're in luck: Linux has dozens. More fortunately, most of the developer effort is coalescing around two: GNOME, from the GNU project; and KDE, from the German KDE group. KDE is currently leading in ease of use, stability and completeness.

Why use others? Well, at one extreme, window managers are fast and take up little memory, while at the other they concentrate on ease of use and interoperability at the expense of lots of processor cycles and RAM.

A lot of holy wars are fought over window managers, and especially KDE. This is because Troll Tech's Qt library on which KDE is based isn't Open Source in so far as it doesn't have a GPL. This sounds an arcane objection to a brilliant GUI (Graphical User Interface), but Linux didn't get where it is today by not insisting on Open Source.

More importantly, while there are lots of basic window managers such as Afterstep and Enlightenment, GNOME and KDE are IDEs, integrated desktop environments based on objects. They enable applications written for them to interoperate, exchange data, support drag and drop and more which can't happen in a simple Linux window manager.

Unless you're running a Linux server or an extremely old PC with a slow processor and limited memory, you will want to run GNOME or KDE. With most Linux distributions you can try both. The reason for choosing a distro with a particular default GUI is because the vendors fine-tune the default GUI and ensure system administration works well from it.

Up and coming

A lot of developer effort is concentrating on workstation use, which is why many distros now support TV cards, scanners and sound by default. Some now arrive with TrueType font support built in until now PostScript Type1 fonts have been the mainstay for graphical work.

A lot of this workstation effort is new and, to a degree, experimental. When it works, it's fabulous, but if you have unsupported hardware or if it hasn't been configured sensibly, then it can be frustratingly unfabulous.

If you're heavily into multimedia and graphics hardware, you have to check the hardware support situation to avoid disappointment. Of course, if you have programming or documentation skills you

> **A reworked distro is not the same as a cheap knock-off copy on a couple of gold discs**

Installation issues

Getting started

Current commercially-packaged Linux distributions are becoming as easy to install as any other PC operating system. It's one of the reasons the Linux user base is growing so fast.

If you want Linux on your PC only, most distros are straightforward to install. To set up a dual boot system with Windows and Linux is trickier because of partitioning issues, but easier than using most other operating systems for a dual boot system. (See our feature 'Start here!' for a comprehensive guide to installing Red Hat 6.0.)

On test

Linux-Mandrake 6.0

PowerPack Edition
Mandrakesoft
Web: www.linux-mandrake.com
Price: £41 (inc VAT)
UK supplier: Interactive Ideas
Tel: 0181 805 10000

The box contains an installation pamphlet and getting started guide along with five CDs, a registration number and a StarOffice personal key number. Unless you have a PC capable of booting from CD-ROM, you have to create a boot floppy using the rawrite utility on a Windows system.

Basically, there's an image of the boot floppy on the installation CD in the /dosutils directory. It's a Windows app you use to create the Linux boot floppy. Dead simple.

During the elegant and painless installation process, you can choose workstation, server or custom. We chose workstation. It correctly detected and set up most of the hardware, including the network card.

We told it what graphics card we had and gave it the monitor specifications. A few seconds later it booted straight into KDE. It also enables you to set up a default, unprivileged user (a Good Thing).

The binaries are optimised for Pentium class processors. This makes Linux run faster but means you can't install this version of Mandrake Linux to an older i386 or i486 PC.

Interestingly, Mandrakesoft claims 99.99 per cent Red Hat compatibility, which is handy as there are a lot more RPM binaries on the Net for Red Hat than other distros.

We had one problem: the kpackage program, used to install and uninstall RPMs, wasn't installed – only its desktop icon. We put it on using the older RPM program. Mandrakesoft says it's a bug in the workstation install routine. Otherwise, an excellent choice.

LINUX ANSWERS RATINGS

Installation	4
Documentation	4½
Configuration	5
Web support	5

OVERALL: 4½

Debian GNU/Linux 2.1

Debian
Web: www.debian.org

Price: £8 (inc VAT)
UK supplier: Linux Emporium
Tel: 01491 837010

This is the purest Linux distribution, entirely maintained by volunteers and made only from Open Source programs. Unfortunately, Debian developers aren't concerned with new users – installation is horrid, takes hours, requires a good deal of knowledge, and you have to sit through it as your input is constantly required.

If you want to install other software, life is trickier. Debian uses its own deb package format, not RPM, and most programs will have to be compiled from source.

A paper manual is available from Debian, but most of the documentation is on disc, where you won't be able to get at it until you've installed everything. What there is assumes previous experience of computers, and ideally of UNIX. Unless you're something of a guru, we wouldn't recommend installing Debian 2.1 unaided.

Once installed and with X configured using XF86Setup, you'll be able to run fvwm95 along with a number of other window managers. Enlightenment (a window manager) is supplied but doesn't seem to be installed by default. You'll need it if you decide to download and install GNOME (a desktop environment). There's a link to a deb packaged version for slink (the codename for Debian 2.1).

Despite the less-than-optimally-friendly graphical front-end you get a lot of useful software including GIMP 1.0.2, Netscape 4.51 and around 2,000 other programs, but no Office-style programs though. All in all, Debian is for computer savvy purists.

LINUX ANSWERS RATINGS

Installation	2
Documentation	3
Configuration	3½
Web support	3½

OVERALL: 3

Red Hat Linux 6.0

Red Hat
Web: www.redhat.com

Price: £52 (inc VAT)
UK supplier: Linux Emporium
Tel: 01491 837010

The retail version of Red Hat Linux 6 comes with two manuals: installation and getting started. Both are good but the latter assumes you will use GNOME. (You can choose to install KDE if you prefer, but this isn't covered in the supplied manual – see our cover feature on page 16 for more on this.)

There's a disc of RPM files and one of source. You also get a disc of commercial products including free personal editions of StarOffice and WordPerfect along with lots of trial programs.

Naturally, installation is almost identical to Mandrakesoft's – quick and easy. The main difference is Red Hat's decision to make GNOME the default user interface (it was KDE and before that it was fvwm).

Red Hat 6 worked immediately without problems and is straightforward to find your way around. We could log on to the Net, print documents and so on.

On the downside, GNOME doesn't have as good a collection of utilities as KDE, which means a lot of the activities you'll want to try have to be done with command line programs, older X apps or apps from the KDE menu. This is confusing to many new users (and to some old ones)

We still think Red Hat's decision to make GNOME the default interface odd, especially when the previous version used KDE, and given the similarity with Linux-Mandrake which uses KDE, we'd recommend Linux-Mandrake over Red Hat. Mandrake's KDE setup is much better than Red Hat's.

LINUX ANSWERS RATINGS

Installation	4½
Documentation	5
Configuration	4½
Web support	5

OVERALL: 4½

Coderoom superstars

On test

SuSE Linux 6.2

SuSE
Web: www.suse.com

Price: £32 (inc VAT)
UK supplier: Interactive Ideas
Tel: 0181 805 1000

German company SuSE makes our favourite distro. We use SuSE 6.2 daily (6.0 and 6.1 before) and prefer it, despite it having a few problems. SuSE supplies an excellent manual, six CDs, a boot floppy and 60 days' phone and email installation support.

Installation is via the YaST configuration utility, which needs an update but is still better than most. With 6.2 the X setup has been dramatically improved with detection and support for a lot more video cards – including those with 3D accelerators.

Once running, you're in KDE 1.1.1 which SuSE configures well. You can be up and using it for real in under an hour. It's well documented internally and easy to reconfigure.

SuSE distros are improving rapidly but the company continues to make silly mistakes. Last time it got the keyboards wrong. This time it didn't include a font server (so no TrueType fonts) because it said it wasn't stable, but did include an unstable version of GIMP.

The only other complaint is it still doesn't install most of its own help system. This is tricky to do yourself without the help system. There's still a lot of German in the English files, too, though less with each release.

SuSE 6.2 is more awkward to install than Mandrake 6.0 and has minor eccentricities. It's a great choice for knowledgeable computer users, but not yet one for the naive.

LINUX ANSWERS RATINGS

Installation	3
Documentation	4
Configuration	4
Web support	4
OVERALL:	4

OpenLinux 2.3

Caldera
Web: www.caldera.com

Price: £37 (inc VAT)
UK supplier: Linux Emporium
Tel: 01491 837010

OpenLinux 2.2 was the first Linux distro capable of being installed graphically from Windows. A version of PartitionMagic for Windows repartitions the hard drive and Caldera's graphical installation sorts out the rest. Basically, anyone can install OpenLinux on a Windows system and it's just as easy on a clean machine.

The Lizard (Linux wizard) installer auto-detects just about everything. You get to test and confirm its graphics resolution decisions and card driver. Finally, you get to play a Tetris clone while it gets on with the installation. Fab!

With 2.3, Caldera has added some impressive features including the Applixware Office suite, KDE theme manager, 4Front sound drivers and endless program upgrades.

Caldera majored on ultra-reliable server versions of Linux before releasing OpenLinux. It's still more concerned with reliability than version numbers, which is a good thing. In fact you can choose from one of several standard installations or customise it for yourself – so servers remain well catered for.

OpenLinux 2.3 uses COAS (Caldera Open Administration System) for configuration. This graphical (and text) tool is Open Source and elegant. Unusually, you can use COAS to edit config files by hand interchangeably.

A neat touch is Kandalf, a friendly wizard who helps you decide how to customise KDE as your first action in Linux.

LINUX ANSWERS RATINGS

Installation	5
Documentation	4
Configuration	5
Web support	4
OVERALL:	5

Xpresso Linux 2000

Xpresso
Web: www.xpresso.org

Price: £15.95 (inc VAT)
UK supplier: Xpresso
Tel: 0208 359 2600

This is a cut-down version of Red Hat 6, but unlike Red Hat 6 it defaults to the KDE graphical user interface rather than GNOME. Xpresso comes on a single CD-ROM with a small, but well-written, booklet detailing the creation of a dual-boot Windows/Linux system, installation and a little on usage.

The installation is as straightforward as Red Hat's and as easy as you'd expect – fast, too. It even boots to Red Hat's own graphical log-in screen. Xpresso claims it's worked hard to make this the best and easiest Linux distro available. Not so.

Under Red Hat you use GnoRPM to install, uninstall and upgrade programs. The equivalent in KDE is kpackage. However, Xpresso chose not to include this, so you have to use the arcane command line RPM program to do it. Easier? No.

What's more, there's a font server but no TrueType fonts and no documentation on this.

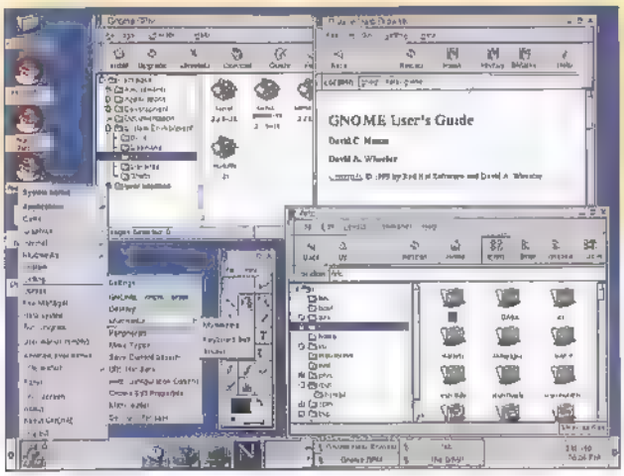
Apart from these obvious points, Xpresso appears to be a pretty standard Red Hat 6.0 distro with some fairly ham-fisted edits such as putting WordPerfect on the KDE menus whether it's installed or not.

As for StarOffice, Xpresso provides its own key and fake registration details rather than giving you a personal key.

If you want Red Hat, spend the extra and get the real thing – it's better documented, more complete and more flexible.

LINUX ANSWERS RATINGS

Installation	4
Documentation	3
Configuration	3
Web support	1
OVERALL:	2



The default GNOME desktop as installed by Red Hat Linux 6 showing the GNOME Panel, default menus, the file manager, user guide and GnoRPM package manager

could always help – almost all new hardware drivers are written by those who need them.

Under development

Linux is always under development with a single person or small group managing the development of each component of Linux (most runs on any UNIX, not just Linux, which refers to the kernel)

This means the software that goes into Linux doesn't march in lockstep: some parts progress by random leaps and bounds; others shuffle or stop as their champions lose interest or move on

The version number of a distro has no connection with the component versions. Most distros make much of having the latest kernel, Apache Web Server, XFree86 or GUI version number, the most apps or best freebies. But the latest software isn't necessarily best

Linux developers release a stable version and a development version. The latter can be unstable and might contain experimental code only other experts should be using.

Including the latest rather than the most stable version can be bad news. This doesn't happen often but commercial pressures tempt vendors to go for the highest number

SuSE did this in version 6.2 of its distro by including developer version 1.1.7 of the GIMP (the brilliant Linux graphic package) instead of the stable version 1.0.4. Use RPM to replace it with a stable version. (See our feature on page 64 for details on this.)

And, finally

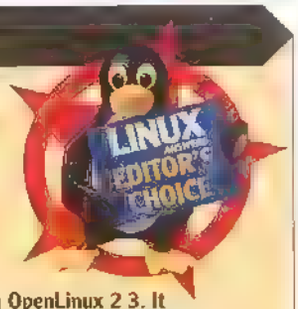
With the core components of most current Linux distros remarkably similar, the best buy depends largely on who you are and what you want. Indeed, as soon as you gain a little experience you'll be modifying whatever distro you have to suit your own interests and needs.

Nevertheless, there are best distros for particular purposes, and here we take a look at six of the many options. Five of them are major vendor releases while the sixth is a reworked, low-cost version of Red Hat 6.

LINUX ANSWERS

Best bird

Editor's choice



The standard distribution for installing a dual boot Windows/Linux system is Caldera OpenLinux 2.3. It wins hands down. If installation doesn't worry you then Mandrake 6.0 is the one we found to be richest in features and most fun to use after installation.

How we tested the distributions

We tested the distros on a home-built PC. It has a 166MHz Pentium on a Chaintech motherboard, 64Mb of RAM, 20x Mitsumi CD drive, 1.2Gb Quantum Fireball hard drive, 4Mb Matrox Mystique graphic card, a SoundBlaster 16 compatible card, an ancient 8-bit SMC ethernet adaptor and a 17 inch DiamondTron monitor. A generic external modem was attached.

Working from the supplied documentation we installed each distro. The ease of installation was noted with special attention to the X Window System – traditionally the trickiest part. It was important that all the hardware was correctly set up, especially the modem.

Our target Linux user for this test runs a workstation on his/her own with no previous UNIX experience. We looked at how well the distro anticipated new user needs with help systems, pre-installed icons for floppy and CD-ROM access, Net access setup and Net utilities, along with productivity software.

Finally, we looked at support issues: the quality of the vendor's Web site support and personal installation support.

Distribution	OpenLinux 2.3	Mandrake 6.0	SuSE 6.2	Red Hat 6.0	Debian 2.1	Xpresso Linux 2000
Default GUI	KDE 1.1.1	KDE 1.1.1	KDE 1.1.1	GNOME 1.0	fvwm95-see text	KDE 1.1
cds	3	5	6	3	4	1
boot floppy*	Yes	rawrite	Yes	Yes	rawrite	rawrite
Source	Yes	Yes	Yes	Yes	Yes	No
Kernel	2.2.1	2.2.9	2.2.10	2.2.5	2.0.36	2.2.5
XFree86	3.3.4	3.3.3.1	3.3.4	3.3.3.1	2.0.36	3.3.4
StarOffice	Yes	Yes	Yes	Yes	No	Yes
WordPerfect	Yes	Yes	No	Yes (UK)	No	Yes
TrueType**	No	Yes	No	Yes	Yes	Yes
Run Windows apps	No	WINE	VMWare trial	No	No	No
Support	90-day email	email 100-day	email/phone	90-day email	none	none

*Is a boot floppy supplied or do you have to make one? ** Is there a TrueType font server pre-installed?
All Linux distributions can be downloaded from the original vendor online

Discover the secrets of the GIMP, the Photoshop-standard image package (p50), and find out how to recompile the kernel (p66)

Get more from KDE, the K Desktop Environment, with our 20 top tips (p56) and find out how to customise Linux for speed (p70)

Learn Bash, the command-line interface (p62), and find out how to install software on your souped-up Linux machine (p64)

29 PAGES OF TIPS, TUTORIALS AND EXPERT HELP!

working with Linux

Whew, it's finally installed. Now for the fun bit – discovering how excellent Linux really is...

PROJECT

Secrets of the GIMP

Behind its geeky name, the GIMP offers a powerful, Photoshop-quality image manipulation program. Michael Hammel discovers its features and capabilities

Linux has grown up in the traditional backrooms reserved for other UNIX servers, out of sight and out of mind. But unlike its predecessors, Linux has a future on the desktop. The X Window System provides the technical framework upon which graphical, user-friendly applications have begun to appear. One of the most intriguing of these is the GIMP.

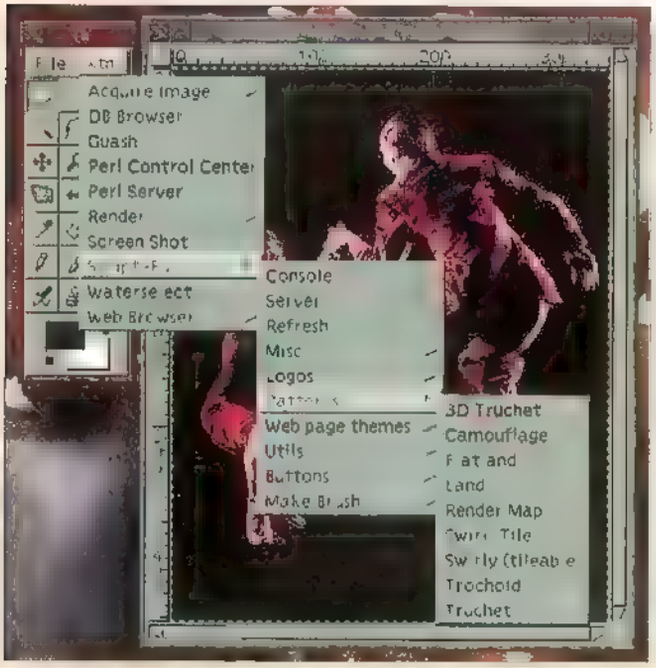
GIMP stands for the GNU Image Manipulation Program. It is a graphics design package which looks and feels very much like Photoshop, the popular Mac and PC application from Adobe Systems. Although not a complete replacement for its Adobe cousin, GIMP does provide a more cost effective alternative for graphic designers, especially those working on the Web.

In this article we take you on a grand tour of the GIMP, which you can install from our Cover CD. So, grab your hat, your coat, and your Linux desktop – we're on our way!

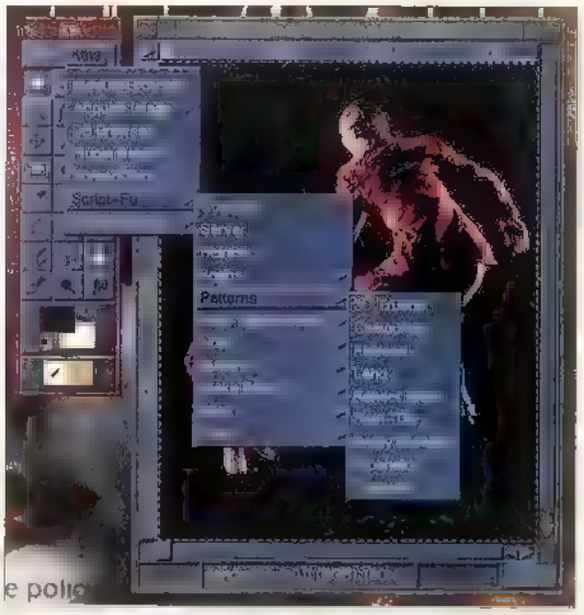
Michael J Hammel is the author of *The Artists' Guide to the Gimp*

1) The GIMP toolbox

Like Photoshop, the GIMP is managed via menus and a Toolbox. Photoshop users will find the GIMP's toolbox familiar, but it's not an exact duplicate.



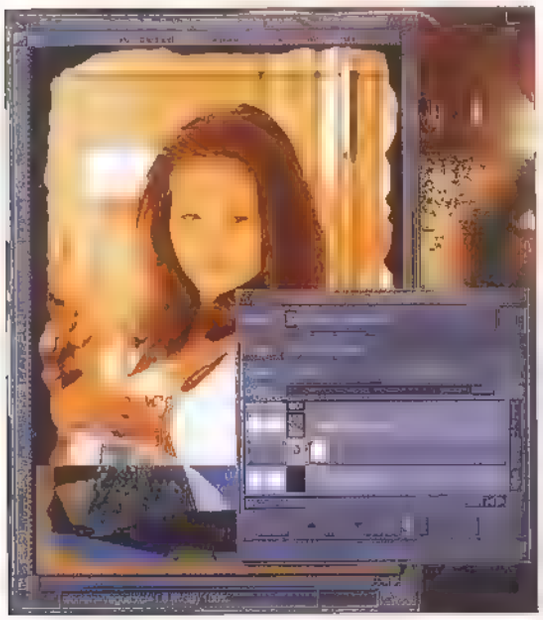
The Toolbox for the GIMP looks fairly similar to Photoshop. This is the standard interface for the current release of the GIMP, version 1.0. Most Linux distributions ship this version ready to run and the interface will have the same colourings shown here. The Xtns menu provides access to features that are not specific to any Image Window. Here, an Image Window is shown with a colourised photo of some 1940s dancers



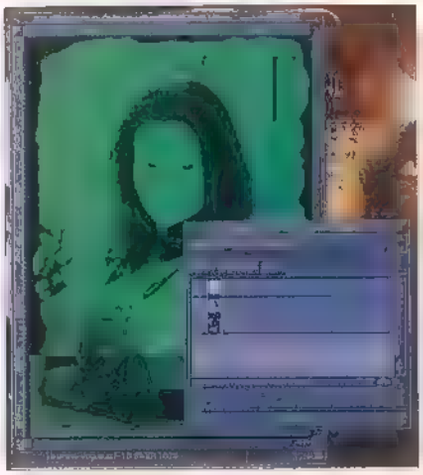
The forthcoming 1.2 release, due out at the end of the year, adds many new features (download it from www.gimp.org). Here you see a unique trait of the GIMP – a user-configurable interface. Using 'themes', you can add colours, shading, even 3D effects to the program's interface. The toolbox gives you quick access to the dialogs for the brushes and patterns via the small buttons at the bottom of the window. The Image Window now provides a Quick Mask feature, like Photoshop's. The small red box on the lower left corner of the Image Window toggles the Quick Mask on and off

2) Layers, channels & paths

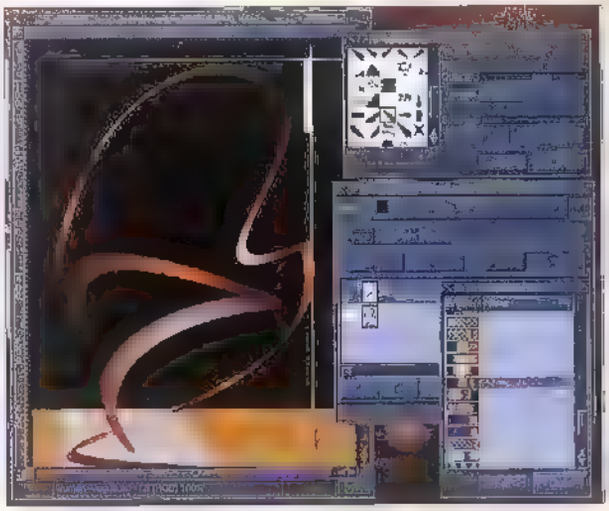
Layers in the GIMP work just like layers of clear acetate – stack them on top of each other to generate the final image. Channels provide direct access to the red, green and blue components of an image, or user-generated masks. Paths let you draw and edit curved lines. Layers and channels in 1.0 and 1.2 work pretty much the same way. Paths, however, are new to 1.2.



1 Open the Layers and Channels dialog box by selecting the correct menu option from the File > Dialogs menu in the Toolbox, or by typing CTRL-L in the Image Window. The dialog follows the active image in the 1.2 version, so just click on another image and the dialog updates automatically. The dialog shows which layer is active, and here you can group layers for move operations, toggle their visibility on and off or blend them with lower layers using one of many blend modes. Here GIMP 1.2 is shown using the BlueSteel theme. You'll see various themes throughout our tour



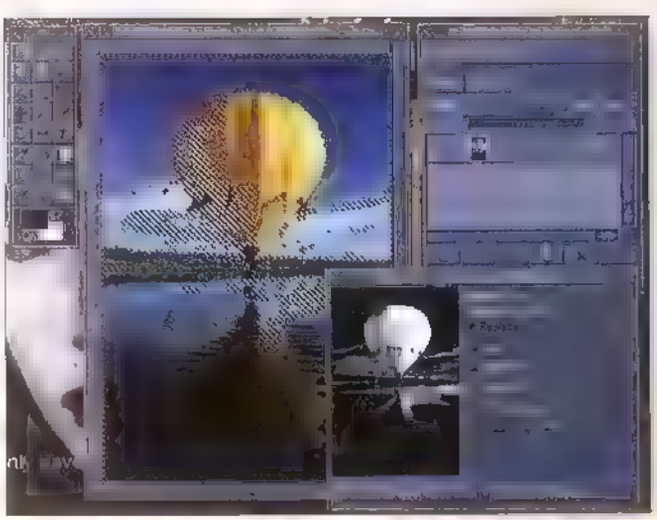
2 Now click on the Channels tab in the dialog. Here you see the three standard channels, one each for red, green and blue. If you click on the eye icon in the blue and red channels, you can turn them off. This results in the original image being displayed with only its green component visible



3 Using the developer's release for 1.2, we've clicked on the Paths tab in the Layers and Channels dialog. Here we can create Bezier curves – lines with control points that allow us to change the shape of the curve between the points. The curves can be stroked using the current brush and drawing tool. Here, we've created a few curves over the background of the original image (with some of the original layers turned off) and then stroked them with a gradient brush. The Gradients dialog enables us to choose or edit the gradient, while the Brushes dialog, in the upper right, lets us select a brush and some of its characteristics

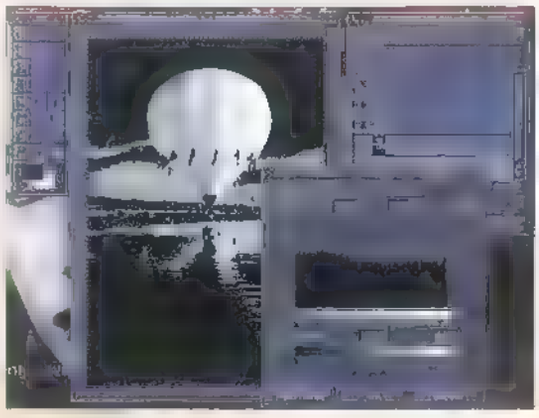
3) Selections & masks

One of the GIMP's key features, like other tools of this ilk, is that you can process regions of an image selectively. The GIMP provides many tools for creating accurate selections, even selections of complex shapes with non-continuous boundaries. We're using GIMP 1.0 here with the BlueSteel theme, so this is something you can try out now.



1 We start with a scanned photograph of a balloon launch over a lake. Our goal is to extend the colour contrast to change the mood of the image. We create a selection using the Select By Colour dialog. Press the right mouse button in the Image Window to open the menu, then choose the Select By Colour menu option. Set the Fuzziness Threshold level to 112 and click in the Image Window over an area of the balloon that is partially lit. The Select By Colour dialog shows a greyscale representation of the selection. White areas are fully selected, black are not, and shades of grey are partially selected

Secrets of the GIMP
3) Selections & masks (cont.)



2 Save the selection to a channel by first choosing **Edit > Copy**. Create a new channel by clicking on the **New Channel** button (lower left of the Channels page). The new channel will be active, so use **Edit > Paste** to create a floating layer. Floating layers are created whenever you paste into an Image Window. Click on the **Anchor** icon (in the Layers page) to anchor the floating layer into the new channel. Now choose **Image > Colours > Levels**. Adjust the middle triangle in the bar below the histogram most of the way to the left. This increases the white levels. Adjusting the left or right indicators will change the black and white points, respectively, enabling you to set the true range of colours in an image. By adjusting the middle indicator, we have effectively created a more solid (but not completely solid) mask from the original selection

3 Duplicate the original layer (fourth button from left, **Layers** page). Click on the **Channels** page again. Right-mouse click on the name of the channel you just created to open the Channels menu. Select **Channel to Selection**. Feather the selection by about 45 pixels (**Select > Feather** in the Image Window menu). This gives a much more complete selection of the balloon, plus some of the sky and lake. The feathering will smooth the operations we're about to perform along the edges of the selection

4 Apply the **Auto Levels** feature of the Levels dialog to the selection. Right-mouse click in the Image Window to open the menu, then select **Image > Colours > Levels**. Click on the **Auto Levels** button. Without closing the dialog, adjust the middle indicator to the right again. Did you see the colour ranges change? Click on **OK** to apply the changes

5 Now, for comparison's sake, let's take a look at the original, the channel we created from it, and the mood-adjusted version. What started with a photograph of an early morning balloon launch has changed to an early evening scene

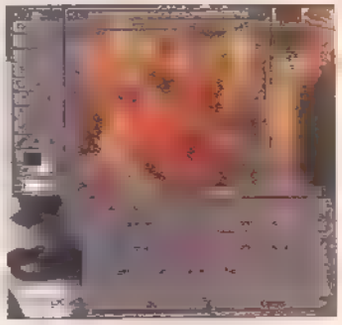
6 To see how the mask could be used, right-mouse click on the duplicate balloon layer and select **Add Layer Mask**. Choose a white mask from the dialog prompt. Now, go back to the Channels page and click on the new channel to make it active. With the mouse cursor in the Image Window, type **CTRL-A** to select the entire channel. Select **Edit > Copy** from the Image Window menu (remember, right-mouse click in the Image Window to open that menu). Click on the layer mask you created a moment ago to make it active. Now choose **Edit > Paste** and anchor the new layer into the mask. Turn off the visibility of the original layer by clicking on its eye icon. What you have left is the duplicate balloon layer with the only visible portions being those corresponding to the white areas of the mask. The grey checkerboard pattern is displayed to show transparency (although you can change this look using the **File > Preferences** menu option in the Toolbox)

4) Gradients & gradient brushes

To the uninitiated, gradients might seem mundane. They are, after all, just variations on coloured bars that line up one after another that may or may not merge smoothly. But gradients are the basis for many special effects: 3D balls, shadows, soft borders, and many others. Gradients are also commonly used to generate tiled backgrounds, as this example demonstrates. Gradients are available in both 1.0 and 1.2, but we'll be using a new feature of 1.2 in this example: gradient brushes. Notice that we've switched themes – this one is known as "Odo".

1 Double-click on the Paintbrush tool to open its Tool Options dialog. Click on the gradient toggle. Open the Gradients dialog (Dialogs > Gradient...) and select Incandescent – or one of the many predefined gradients available. Now click on the brush button in the Toolbox (bottom row of Toolbox, on the left) to open the Brush Selection dialog. Select a brush. Now start painting in the Image Window. Just hold down the left mouse button and drag it around. The colour of the brush stroke changes according to the gradient selected and the type (which defaults to Loop Triangle). To get a stroke that looks more like a real brush stroke on an artist's canvas, try adjusting the spacing in the Brush Selection dialog. When you're happy with the design, just stop painting

2 To tile the pattern, select Image > Channel Ops > Offset from the Image Window menus. Click on Offset by (x/2), (y/2) and make sure that the Wrap-Around toggle button is set. Then click on OK. The edges of the original image will now be lines that cross the middle from top to bottom and left to right. Paint over these lines to hide them. To make sure you get the new edges right, offset the image again and double-check that the middle of the image looks smooth. Add some random noise to the image: Filters > Noise > Noisify. Turn off the Independent toggle and move the red slider forward a bit to add more noise. If you don't turn off the Independent toggle, you'll get noise with a red tint to it



3 Displace the image using Filters > Map > Displace. Keep the default settings for an image that's about 400x400. Offset the image again. There will probably be some measure of non-uniformity in the image through the middle horizontally and/or vertically. To clear this up, use the Clone tool (the tool that looks like a rubber stamp in the Toolbox) with a brush that is not uniform in shape (something like "Galaxy, Small"). Set the brush opacity to about 75. In the Image Window, hold down the Shift key with the mouse cursor over an area about halfway from the centre of the image to any corner. A cross-hair displays when you do this. That's the source location. Now release the Shift key. Move the mouse over the straight-lined portions of the offset image, hold down the left mouse button and drag the mouse around. The pixels from the source region are merged with the area under the mouse, removing the linear aspect of the image. You might need to reset the source location as you move near the edges of the image. Offset the image again and verify (or fix if necessary); all the edges are no longer visible

5) Blend modes

Blend modes enable you to combine pixels between two objects. They are most often used with layers as they can create interesting effects without changing any pixels. Blend modes are also used with brushes, enabling you to blend brush strokes with existing image pixels.

Blend modes can generate many visual effects. One of the most useful is to bring out the highlights in an underexposed scan. In the following two examples, we'll look at using blend modes to generate an interesting visual overlay to an image, and to fix an underexposed scan.

1 We start with a scanned photo of some balloonists over a nearly uniform blue sky backdrop. Create a second image with the tiled gradient like we did with our example on gradient brushes

PROJECT

Secrets of the GIMP
5) Blend modes (cont.)

2 With the mouse cursor in the tile image, type **CTRL A** to select the entire image. Choose **Edit > Copy**. Move the cursor back to the image of the balloonists. Select **Edit > Paste** and convert the floating image this creates in the Layers and Channels dialog into a new layer. This is done by choosing **New Layer** from the Layers menu (right-mouse click on any layer's name). You now have the tiled image layered above the balloonists, but only the tiled image is visible. Left-mouse click on the tile layer's name to select it, then choose **Colour** from the **Mode** menu. The colouring of the tile layer is now combined with the entire balloonist layer to generate the effect shown

3 Turn off the visibility of the tile layer temporarily (click on its eye icon). Create a layer mask of the balloon and its occupants with the **Fuzzy Select** tool. If you're using the 1.2 version, you'll be able to set the Fuzzy Threshold level to about 4 or 5, something pretty low. In 1.0, you might have better luck with the **Select by Colour** dialog. Using a low threshold is possible because there is a high colour variation between the sky and the rest of the image. You should be able to get a very good selection of the sky with an image like this. Select **Edit > Copy**. Create a layer mask for the tile layer and click on it to make it active. Select **Edit > Paste** and anchor the floating layer into the mask. Note how the effect from the previous frame is now only applied to the balloonists. The effect is more dramatic if you made the selection with Fuzzy select because it won't have any semi-transparent pixels (grey pixels in the mask) in the middle of the image. **Select by Colour** might, but you can adjust the levels in the mask to fix this

4 To show how a blend can fix an underexposed scan, we start with the bad scan. Note that the background in this image is fairly well lit, but the subject in the foreground is extremely dark. Despite the appearance, there is plenty of information in this region of the image. We just need to bring it out

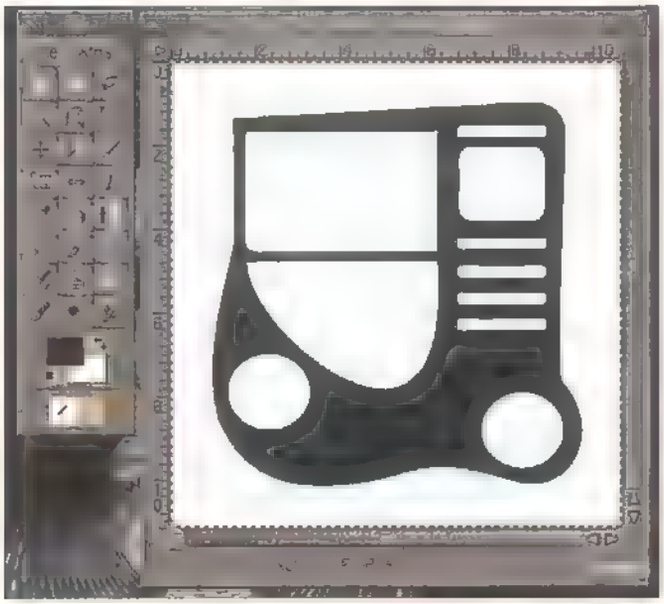
5 Duplicate the layer and desaturate that duplicate (**Image > Colours > Desaturate**). Type **CTRL-A** to select the entire duplicate layer. Choose **Edit > Copy** from the Image Window menu. Next create a layer mask for the duplicate. Click on the mask to make sure it's active, then choose **Edit > Paste** and anchor the floating layer into the mask. Choose **Image > Colours > Invert** for the mask. This makes the dark regions of the image show through and masks out the light regions. Enhance the mask using Levels (**Image > Colours > Levels**) and/or Brightness-Contrast (**Image > Colours > Brightness-Contrast**). Now Gaussian Blur the mask. The larger the blur, the softer the effect of bringing out the details in the dark region

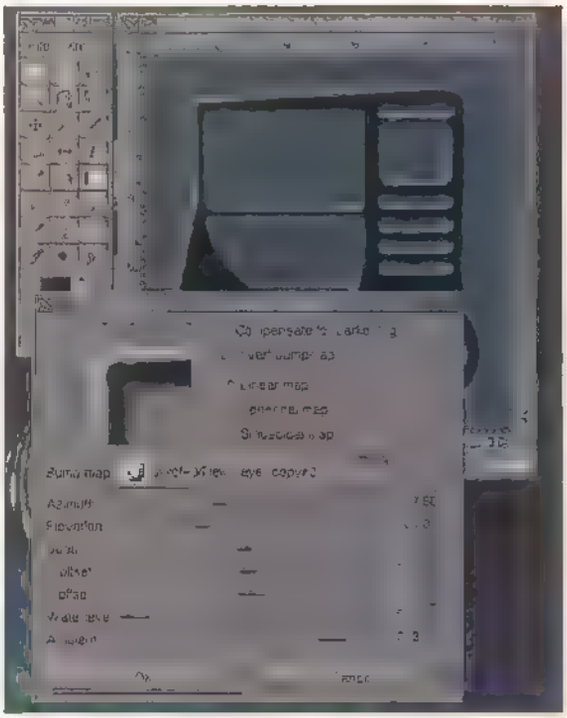
6 The last step is to change the blend mode for the duplicate layer to **Screen**. This enables you to add the grey regions of the duplicate which are not masked out to the original layer, and this then makes them become lighter and more detailed. Depending on the image you start with, you may want to use **Overlay** instead of **Screen**. The white regions of the mask need to be the regions you want to bring out, but you can perform the opposite operation (overexposing the scan) by not inverting the mask. You can generate many other effects by either inverting or not inverting the mask and by choosing one of the many blend modes available

6) Interface design

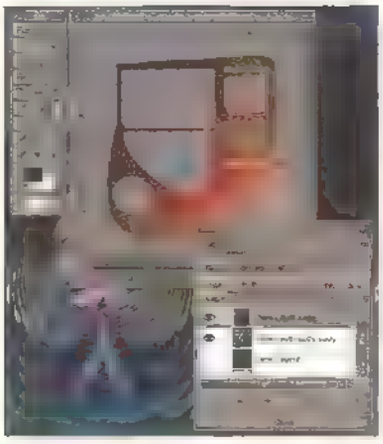
Filters, which we've just touched on when we used the Displace filter in the gradient brush example, are the workhorses of special effects in the GIMP. These are all external programs, although a large collection of them are standard with any GIMP distribution. Here we'll create a funky 3D metal plate, something you might do while working on a multimedia application.

1 Let's start with a black-and-white image. The outline was hand drawn, scanned, contrast enhanced, blurred and enhanced again. Then the inside was selected, feathered and filled with black





2 Working on a duplicate layer (we'll need the original later), we blur the entire image to create soft edges. The wider the soft edges, the more dramatic the 3D effect. Open the Filters > Map > Bump Map dialog. A linear mapping, possibly inverted, will probably work best, depending on the shape and amount of blur applied. Increasing the elevation and depth will change the height that the edges appear to sit above the layer. The azimuth will change the direction from which the light shines. Play with these until you find something that looks acceptable. Click on the OK button when you're done



3 Returning to our tiled gradient brush example, copy the entire tile image (Edit > Copy). Paste it into the bump-mapped image and make it a new layer. Choose Scale from the Layers menu if you need to make it fit the current image. Select the original layer (click on its name), type CTRL-A, and choose Edit > Copy. Duplicate the bump-mapped layer and add a layer mask to the duplicate. Click on the mask to make sure it's active and choose Edit > Paste. Anchor the floating layer into the mask by clicking on the Anchor icon. Turn off the visibility on the original layer and the bump-mapped layer. Now click on the tile layer and change its blend mode to Overlay. You may find the effect works better with a different blend mode, depending on the colours used and brightness of the tile layer

4 What's left? Well, you can add a black to white gradient layer that has the original layer applied as a layer mask and set this layer's mode to overlay. The new layer is placed between the bump-map layer and the tile gradient layer. This will produce the dark to light highlight you see running across the face of the plate. The background is another layer, below the other visible layers, that was created by generating some noise (Filters > Noise > Noisify), masked with some Solid Noise (Filters > Noise > Noisify), and coloured with multiple gradients. Of course, the way the light shines on this plate, out in space, means either that there are two light sources or the plate has some strange properties! But you can see how easy it is to create some complex effects with the GIMP!

Now take a trip to our Web site at **www.linuxanswers.co.uk** to find out about distortion and rendering filters

Clean up your workspace

20 ways to make the most of KDE

Know your way around KDE but want to get more from it? **Matt Kynaston** gives you some tips on how to customise your desktop environment

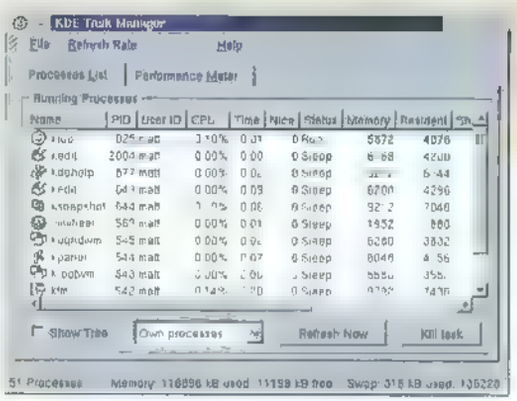
Now that you've successfully installed Linux, you can start to customise your desktop environment. KDE is easy to get to grips with, especially if you're used to a GUI like Windows. Here are 20 tips to help you find your KDE feet:

1 Help is at hand

You'll find a lot of excellent documentation with KDE itself. Click the book icon on your panel to launch KDE help

2 Add all your programs to the K menu

Not every program on your system is available on your K menu. To add them all, run K > System > Appfinder. This puts them all in K > Personal > Red Hat Linux. You may want to move them to more useful places later (see 'Adding Netscape to your panel' for an intro to KMenuEdit)



The KDE task manager busily at work (see tip five; go on, you know you want to)

3 How to use KFM to download and upload from FTP

KFM, KDE's file manager, displays FTP sites just like folders on your local drive. Just go online

and then type ftp:// followed by the address into the address bar. If you're working on your Web page, or using another site with a username and password, simply type ftp://<ftpsite-username>@ followed by the ftp address, and KFM will prompt you for the site's password.

4 Browsing Web pages with the file manager

KFM moonlights as a Web browser, too. Just type a URL into the address bar, and off you go. This is great, but if a folder on your local drive contains a file called index.html, when you open it, KFM will display that page. To see the files, select View and uncheck HTML View

5 How to kill programs

Has Netscape died on you? Well, don't despair! KDE's task manager is the equivalent of the Windows three-fingered salute (Ctrl-Alt-Del), and it's available from K > System. Select the program and click Kill Task. You can also hit Ctrl-Alt-Esc, then click with the skull-and-crossbones cursor on the misbehaving window to kill it. Unlike Windows, this won't mess up other programs that are running or bring your whole system down!

6 Keyboard shortcuts

Is your mouse giving you tendonitis? Well, try out these wrist-savers:

Ctrl-Esc – Switch to another open application
Alt-Tab – Traverse windows on current desktop
Ctrl-Tab – Traverse virtual desktops
Ctrl-F(n) – Switch to virtual desktop 'n'
Alt-F4 – Close current window

But remember, this is Linux, so you can change these or make your own. To do so, go to K > Settings > Keys > GlobalKeys

7 The mini command line

Do you need to launch an application quickly but don't want to open a terminal just for this? Hit Alt-F2. Note: you can't use this for commands that give a prompt such as su root.

8 Running programs at startup

Want a program to run at startup? Just make a kdelnk to it (copy program from the Templates folder to your desktop and edit the properties – see 'Adding Netscape to your panel' for an example). Now drag it into the Autostart folder on your desktop

9 Window trickery

Windows users will find the three buttons at the top-right of a window familiar: Minimise, Maximise and Close. But KDE does more than this. Try double-clicking on the title bar of a window. Everything but the title bar disappears – this is a trick known as 'shading' that any Mac user will know well. Now try clicking on the Maximise button with your right and middle mouse buttons (if you're emulating three buttons, click both buttons at once for middle). You'll also notice a pin on the top-left of the window. Click it and the window will 'stick', and then appear in all your virtual desktops.

10 The KDE Control Centre

This is the place to go for KDE-wide configuration and system information. Open it up and have a poke around. Try playing with the following:

Applications > File Manager
Change the colours and fonts for KFM
Applications > Panel > Disk Navigator tab
Click Ignore case when sorting if you can never remember if you're looking for .Xdefaults or .xdefaults
Desktop > Desktop Icons
Check Transparent Text... to make the background show through icon text. Try doing that in Windows!
Information > Partitions
Examine your drive setup
Windows > Titlebar
Change mouse action if you want the titlebar to iconify instead of shade when double-clicked

11 Drag-and-drop printing

Do you want to print a file quickly? Put an icon on your desktop on to which you can drag and drop files. First you need to know what your printer is called. If you chose the defaults during printer setup, it will be called 'lp'. To be sure, check K > Utilities > Printer Queue. The printer drop-down list shows the name you seek. Open the

Jargon busters

Not au fait with all the terms we've used? Well here's a guide to some of the tricky terminology:

K > Utilities > Konsole
Click on the **K** menu at the lower left of your screen, then click on the **Utilities** menu item to see those choices, and then click on the **Konsole** menu item

$HOME/Desktop
This means the desktop folder in your home directory, in other words **/home/<username>/Desktop**. In the K file manager, it's known as **My Home**. In the terminal, type **$HOME** and it will work out what you mean

Alt-Tab
Hold down the **Alt** key and hit the **Tab** key

<your password>
Type whatever is indicated, without the <...>

Virtual desktop
By default, KDE has four desktops. Quickly switch between them using **Alt-F1** to **Alt-F4**

Edit the file...
There are a number of different programs you can use for editing files. KEdit is probably the easiest. If clicking once on the file doesn't open KEdit, right-click, choose **Open with...** and type **kedit** in the box

Templates folder on your desktop and drag and drop the Program icon to your desktop, then choose Copy. Right-click on it to select Properties. On the General tab, change the name to Printer.kdelnk. Go to the Execute tab. If your printer name is the default lp, type the following in the first Execute text box:

```
lpr %f
```

If your printer name is anything else, type:

```
lpr -P<your printer name> %f
```

Now select an icon by clicking the big wheel button, then click OK

12 Bookmark the root

Can't remember which bin (binary file) you were just in? KFM, the file manager, has a handy bookmark feature – use it to go to your favourite hacking zones quickly

13 KCharset: wrong charset!

If you launch an application from a terminal, you'll sometimes see this puzzling message. It's only a warning and nothing to worry about. If you're fed up with it, though, open K > KDE Control Centre and select Languages under Desktop. Make sure the first, second and third language options are all the same.

14 Making space in your desktop

Got a small screen and need more space? Go to K > KDE Control Panel and select Applications > Panel > Panel tab. In the Taskbar box, select hidden. This hides the bar across the top of the screen. You can still access all the open programs via the Windowlist button on the panel at the bottom of the screen. Next, go to the Options tab, and check Auto-hide Panel. Now the panel at the bottom will hide itself. To get it back, just move your mouse to the bottom of the screen. And don't forget, you can have all the virtual desktops you need.

Find a shortcut

How to add Netscape to your panel

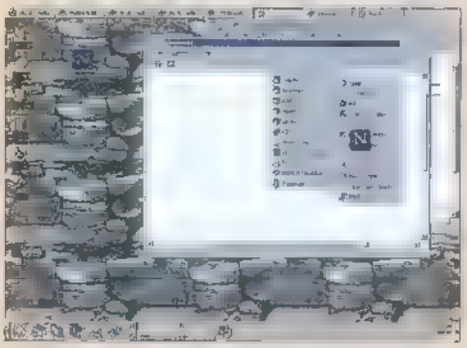
Like all things Linux, there's more than one way to do this. The method we describe is a little long winded, but it takes in a couple of other tricks, too. Once you're done, you'll have shortcuts on your desktop, in all users' K menus, and on your own panel.

1 First let's put a Netscape shortcut on our desktop. Click on the **Templates** folder on your desktop and drag the **Program** icon to your desktop. Select **Copy** from the popup list

2 Right-click on the icon and select **Properties**. Under the General tab, change the filename to **Netscape.kdelnk**. Under Execute, type:

netscape %f

into the Execute text box, then click on the wheel button to change the icon for the shortcut. There's a lot in there, but scroll down until you find the Netscape symbol, click on it, then click **OK**.



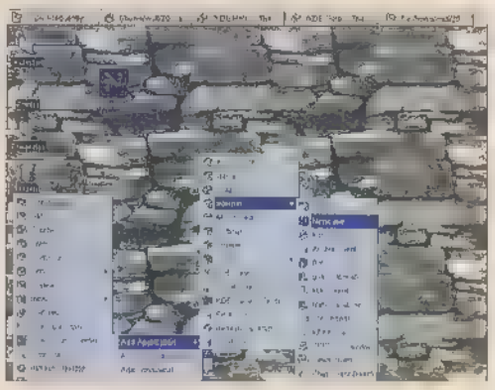
Now go to the Application tab and, under Name, type **Netscape**. Click **OK** to close the Properties window. You should now have a Netscape icon on your desktop.

3 Now we need to add Netscape to all users' K menus. As this involves changing more than just your personal settings, you'll need to be root. Click on the Terminal icon on your panel and type:

```
$ su root
Password: <enter root password>
$ kmenuedit
```

KMenuEdit is a program for editing menus. You'll see your K menu displayed on screen. Select the Internet group to open it. Now drag the Netscape icon from your desktop on to the open Internet group

4 We don't want Netscape hidden down at the bottom of the list. Right-click on the menu entry and choose **Select Item for moving**. Then drag the Netscape entry up to the top. Once you're happy with the order, save your handiwork with **File > Save**, then quit. Back at the Terminal window, type **exit** so you're no longer root.



5 The last step is to add Netscape to your panel for even faster access. Select **K > Panel > Applications**. The entire K menu will open. Select **Internet > Netscape**.

That done, you now have four ways of launching your Netscape browser. You can type **netscape** in a terminal, click on (or drag an HTML file on to) the icon on your desktop, start Netscape from your K menu or launch it from your panel.

Rodent angst

Getting your wheel mouse to work

Getting your wheel mouse to work with KDE is just a question of a quick hack and a simple installation, provided you have a supported mouse. Most of the common ones – MS Intellimouse, Logitech and MouseMan – work fine. Even so, wheel-mouse support isn't universal – the program must work with them in the first place (like StarOffice), be integrated into an environment that understands wheels, or be tweaked by you. Netscape falls into the last category, so we'll show you how to make it reinvent the wheel.

But first a bit of hacking. Log off, then log back in as root. Open your file manager, switch to **Tree View**, and then navigate your way to the **/etc/X11** directory.

Find **XF86Config**, right-click and select **Copy**. Then right-click on a blank part of the directory and save it as something like XFConfig.bak – this file contains all those precious monitor settings, so you don't want to lose it!

Now click on the file. It will open in KEdit. Scroll down until you find:

```
Section "Pointer"
   ...bunch of stuff...
EndSection
```

This is where your mouse setup resides. If during installation you chose 'Emulate 3 buttons', you'll have a line **Emulate3Buttons...** among the stuff. Put a # at the beginning of the line to comment it out – wheel mice don't like emulating anything.

Next, find the line **Buttons ...** and change it to read:

```
Buttons 5
ZAxisMapping 4 5
```

Save your handiwork and close KEdit. For GNOME, this is all you have to do, but with KDE it's not quite so simple.

Put the *Linux Answers* CD-ROM in your drive and mount it by clicking the icon on your desktop. Then, from a type:

```
rpm -Uvh /mnt/cdrom/extras/wheel-mouse/imwheel*
```

This installs the imwheel program. Log off, then back in as yourself, hit **Alt-F2** to open up the mini-command line and type:

```
imwheel
```

You should now find that you can scroll windows using your mouse wheel. However, you don't want to have to type **imwheel** every time you login. To make it run automatically at startup, place a link to it in your Autostart directory. You can do this by typing the following in a terminal:

```
ln -s /usr/X11R6/bin/imwheel $HOME/Desktop/Autostart
```

Unfortunately, Netscape doesn't take any notice of this. If you want to surf with your wheel, you'll have to do some more hacking. Take a look on the *Linux Answers* CD-ROM in **extras/wheel-mouse**, and you'll find a file called **imwheelrc-netscape**. Open this in a text editor and cut and paste it to the end of **/etc/imwheelrc**.

Restart imwheel, then give it a try. Try holding down the Shift key while you wheel. If you've got Netscape set up as your newsreader, try holding down the Windows key to move between messages.

For more information on imwheel, hit **Alt-F2** and type **man:imwheel** or visit **http://solaris1.mysolution.com/~jcatki/imwheel/**. See the 'Essential Web sites' box over the page for more wheel mouse info.

15 Read the manual

The manual pages give every detail of all the commands you can type in a terminal window. To read them in a KFM window, Alt F2 and type man:<command>

16 Edit your system files

If you want to hack some system files and need root access to them, you can open a special file manager as root. Go to K > System > File Manager (Super User Mode). You are prompted for your root password, then the file manager opens. Select File > Terminal if you need a root terminal to work in. Be very careful, though, you can do serious damage to your system when you're root!

17 Change your wallpaper

Tired of your blue background? Right-click on it, select Display Properties and choose some colourful wallpaper. If you have a favourite image you want to use, you can put it in /usr/share/wallpapers

18 Changing screen resolution and colour depth

You control screen resolution and colour depth via X, not KDE. But if you specified more than one default resolution when you set up X, you can toggle between them using Ctrl-+. Colour depth is a little trickier. If you don't have a graphical login, type:

```
startx — -bpp <colour depth>
```

where <colour depth> is 8, 16, 24 or 32. For a more permanent solution, either run XF86Setup again and change your defaults there or manually edit XF86Config.

19 Adding or removing the graphical login

If you've set up your system so that it boots into the standard text login and now want to make it boot to the Red Hat graphical login, you must edit /etc/inittab. To do this, you must be root. Note: if you get this wrong, you may not be able to log in at all!

Go to K > System > File Manager (Super User Mode). You'll be prompted for your root password. Open the /etc directory and copy the file inittab to something like inittab-backup, then open the original in a text editor. Find the line:

```
id:3:initdefault:
```

and change it to:

```
id:5:initdefault
```

Then scroll down to the bottom of the file and make sure the last line is:

```
x:5:respawn:/etc/X11
/prefdm -nodaemon
```

Note, if you've installed GNOME or KDE separately since you set up your system, this last line might be different, so you'll have to figure out where it should

TIPS

point to. Save your handiwork and type init 5 from the console to test your new settings.

Removing your graphical login is just the reverse. Find the id:5:initdefault line /etc/inittab and change it to id:3:initdefault. Next time you reboot, you'll get the classic text login.

20 How to change your desktop environment

Switching desktop environments is easy, as long as you have another installed. Go to K > System > Desktop Switching Tool and choose GNOME. Logout to restart X. If you want to use GNOME by default, open $HOME/.XClient-default in a text editor. Change the line:

```
exec kde-session
```

to

```
exec gnome-session
```

Finding out more

Need a quick K fix? Then take a trip to one of these handy Web sites dedicated to the K Desktop Environment:

www.uk.kde.org
The UK mirror of the KDE pages. Vital reading

http://lists.kde.org
Massive searchable archive of the KDE mailing lists. If you've got a problem, chances are the answer's here somewhere

www.inria.fr/koala/colas/mouse-wheel-scroll/
Everything about wheel mice and Linux

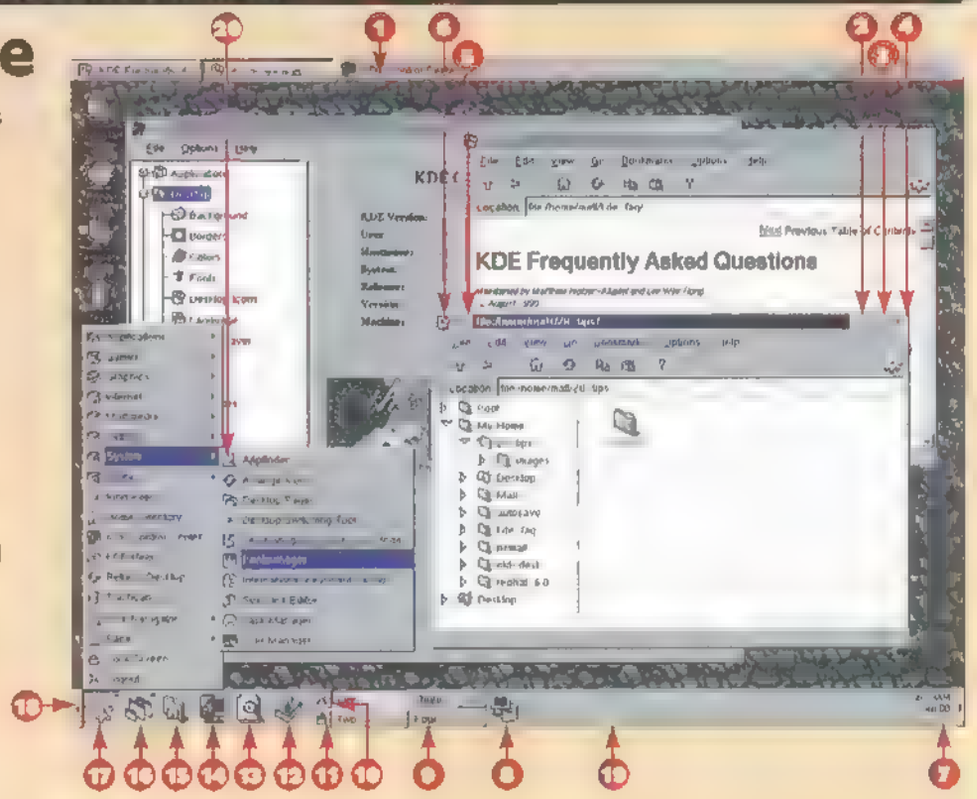
http://kde.themes.org
Customise your desktop. Thousands of themes to download

http://monitor.blvk.ch/euro/
All you ever wanted to know about displaying the Euro symbol in KDE

Your key to the K Desktop Environment

KDE at a glance

Windows users shouldn't have too many problems getting to know KDE, but there are lots of subtle tricks tucked away behind the buttons:



1 Taskbar – all your running programs show up here. Clicking on one takes you to it, no matter which desktop it's on

2 Iconify – send the window up to the Taskbar. It's the same as 'Minimise' in Windows

3 Maximise – make the window fill the whole screen. Try clicking with the middle and right mouse buttons

4 Close – closes the window and terminates the application

5 Pin – click to make this window appear in all your virtual desktops

6 Window Options – choose 'To desktop' to send the window to another virtual desktop

7 Clock applet – lets you know it's 3am when you're still trying to figure out KDE

8 Terminal – enables you to launch a terminal window quickly

9 Virtual Desktop selectors – click on one of these to go to another virtual desktop

10 Logoff – end your session

11 Lock – locks the screen. Requires your password to revive it. Great for keeping away the prying eyes of co-workers

12 KDE Help – all the manuals at your fingertips

13 Find – use this to hunt down that elusive file

14 KDE Control Centre – this is where you can customise your environment

15 Home – launch the K File Manager in your home directory

16 Windowlist – quickly go to any window on any desktop. Handy if you want to hide the taskbar

17 K menu – like the 'Start' menu in Windows, here's where you'll find all your applications

18 Hide the panel – click here to get it out the way

19 Panel – home to useful shortcuts and funky applets

20 Menu – completely customisable. See 'Adding Netscape to your panel'

Don't know your ISP from your KDE? Look no further...

JARGON

Gobbledegeek

Big endian and little endian: the sequence in which a processor stores bytes of data. In big-endian architectures, the most significant bytes are stored in the lowest memory address. In little-endian-based architectures, the least significant bytes are stored in the lowest memory address. Most UNIXes and the Internet are big endian based. Intel processors are little endian-based.

Bit mask: a pattern of binary values. See 'netmask'.

Daemon: (pronounced demon or dumon). A process that runs in the background and performs a specified operation at predefined times or in response to certain events. Typical daemon processes include e-mail handlers and print queues. The term comes from Greek mythology, which describes daemons as guardian spirits.

DNS: short for Domain Name System. The Domain Name System provides mappings between domain names and IP addresses. A domain name server converts names to addresses and addresses to names.

Ethernet: a networking hardware standard. Ethernet is by far the most common network hardware. It usually consists of cables, network cards, and possibly a hub or switch.

Firewall: a firewall is a break point between networks where all traffic is examined and accepted or denied based on a set of rules. They are used to grant some measure of security in a network. By placing a firewall between a home network and the Internet, you block connections originating from the Internet to your home machines while still allowing all your machines to use the Internet.

FTP: File Transfer Point. A typical protocol used on the Internet for downloadable files.

GNU: a complete free software system that is upwardly compatible with UNIX. GNU stands for 'GNU's Not UNIX'.

GUI: short for graphical user interface.

Header files: in C, header files define basic functions such as printing to the screen and writing data to disk. They save programmers work by allowing them to use the headers rather than writing each function by hand.

IP Address: short for Internet Protocol Address. A unique address assigned to each computer on a TCP/IP network (such as "205.160.0.81").

IP Routing: Short for Internet Protocol Routing. The process of receiving an IP packet addressed to somewhere else on one network and sending it on its way via another network.

ISP: short for Internet service provider. A facility that sells Internet services to consumers/businesses.

KDE: a powerful graphical desktop environment. KDE is an Internet project and truly open in every sense. Development takes place on the Internet. No single group, company or organisation controls the KDE sources. All KDE sources are open to everyone and may be distributed and modified by anyone subject to the well-known GNU licences.

Kernel: the basic functions of any operating system, like Unix or Linux.

LILO: LInux LOader. Program used to boot Linux, and used as a boot manager as well.

Module: a module includes software that can be loaded and unloaded as needed while your operating system is running. The module is loaded when the kernel is asked to perform a task that requires that module. Kernels that are compiled to use modules are known as modular kernels. Kernels that are compiled with all software built in are known as monolithic kernels.

Netmask: a 32-bit bit mask which shows how an Internet address is to be divided into network, subnet, and host parts. See 'bit mask'.

PAP: short for Password Authentication Protocol. With a PAP login, a PPP session is started before the username/password is transmitted. PAP is a password authentication scheme supported by PPP. Conversely a clear-text login would deal with passwords (in clear-text;) before the PPP is started.

Ping: a program used to send an echo packet over a network. The Ping program is typically used to determine if there is connectivity between two machines on a network.

PPP: short for Point-to-Point Protocol. A popular protocol used to transmit data packets between two points.

pppd: short for Point-to-Point Protocol Daemon. By far, the most popular UNIX implementation of PPP. This program deals with connecting the PPP protocol directly and has many slick little features such as the ability to run scripts upon initiation or completion of a PPP session. Not only can pppd run as a client, but it can also run as a server, so in theory you could be your own ISP!

RISC: Short for Reduced Instruction Set Computer. A chip architecture that reduces chip complexity by using simpler instructions. In short, RISC helps make the CPU faster. Note: Intel processors aren't RISC; they use an instruction set called CISC (Complex Instruction Set Computer), which inevitably slows them down. Operating systems must be written differently to run on these different architectures.

Shell: another term for user interface. Operating systems and applications occasionally provide an alternative shell to make user interaction with programs easier. A 'command shell' is the command processor interface, the program that executes operating system commands.

SMP: short for Symmetric Multiprocessing, a computer that's equipped with more than one CPU. SMP provides faster performance by making multiple CPUs available to complete individual tasks simultaneously.

SPARC: short for Scalable Performance ARChitecture, a family of 32-bit RISC-based CPUs developed by Sun Microsystems.

SSH: short for Secure Shell, a program developed by SSH Communications Security that lets you log into another computer over a network to execute commands in a remote machine and to move files from one machine to another. SSH includes strong authentication and secure communications over insecure channels.

Subnet Boundary: IP addresses can be grouped into subnets of some size, usually evenly divisible by 8. A subnet boundary is a limit between two subnets. You could figure out where your subnet boundary lies by looking at your netmask and network numbers.

UNIX: an operating system developed by AT&T Labs in 1969. Used mostly by government and academic agencies, UNIX is one of the first, true network operating systems.

WINE: Literally stands for "Wine Is Not an Emulator", a program used to run some Win32 apps under X Windows.

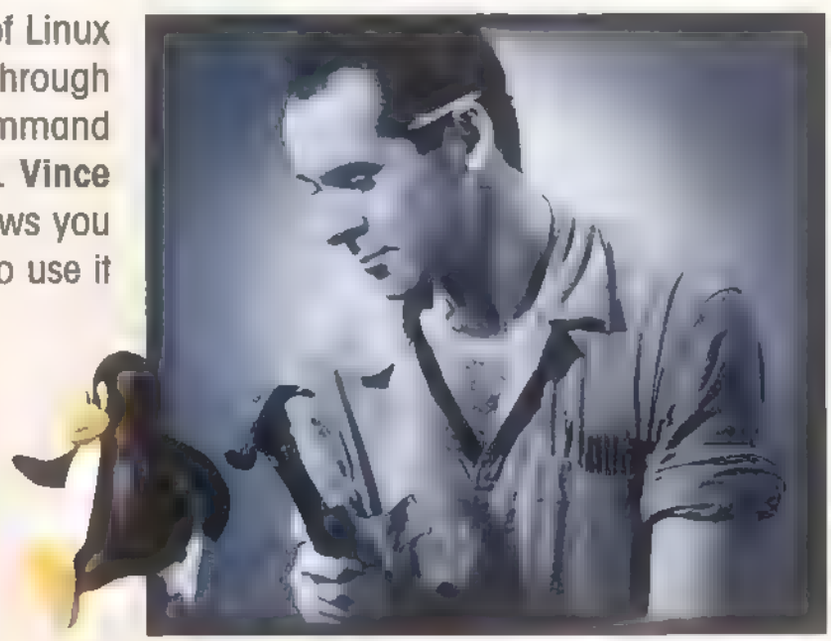
X Windows: A graphical user interface for UNIX and UNIX-like systems.

TIPS

Command Line Survival Guide

How to take control of Bash

The real power of Linux is accessed through Bash, its command line interface. **Vince Veselosky** shows you how to use it



You've finally got Linux installed and it's booted into KDE. You've explored the desktop and come across something called Konsole (it's under the K menu in the Utilities folder). This enables you to type in Linux commands directly.

There are a few simple commands that you will need to know if you want to survive the Linux command line interface.

Linux is case sensitive. This fact cannot be stressed enough. A file called 'myfile.txt' is not the same as 'MyFile.txt' or 'MYFILE.TXT'. Linux sees all these as distinct from one another, and you could have all three in the same directory without conflicts.

The commands you type are also case-sensitive, so watch out for that Caps-Lock key. The second thing to trip up new users is file permissions.

Since Linux is designed as a multi-user system, the file system keeps track of what files belong to what user.

If you are the owner of a file, you may designate who is allowed to read and write that file by granting permission. The Linux system and configuration files are owned by the user 'root', the system administrator. If you are logged on as root, you have access to all these files. If you are logged on as another user, you cannot change these files. For this reason, you should never log in as "root" except to perform system administration tasks). Normal users are prevented from doing stupid things like erasing every file on your system (it only takes one command). The root user has no limits.

Some other things to watch out for: if a command succeeds, it will usually report nothing, and simply return you to the prompt.

Command options on Linux are preceded with a dash - rather than a slash / as in DOS. This is because Linux uses the slash / as a directory separator, where DOS uses the backslash \. Both Linux and DOS have a PATH environment variable that tells you where to search for programs when you type their names at the prompt.

However, DOS always searches the current directory first, and then the PATH. Linux does not look in the current directory at all.

To run a program that is in the current directory, precede it with the full path name, or with ./ (shorthand for 'current directory')

Getting help

Your Linux system has an online manual that you will need to consult from time to time. You use the command man to access it. For example, if you want to learn more about the ls command, type man ls. This displays a help screen describing the program and its usage.

Man pages, as they are known, are formatted on the fly from special source files, and are displayed using the program less. less is a simple display program similar to more, allowing you to view files that are longer than a single terminal screen, but it allows more liberty in scrolling.

You can scroll back and forth line by line with the arrow keys or whole screens using the PgUp and PgDn keys. When you're done reading, press Q to quit (the escape key will not get you out of less) and you'll get back to the command prompt.

Man pages are stored in a categorised database. These are the standard categories (you can think of them as sections of the manual):

1. **User commands**
2. **System calls**
3. **Subroutines**
4. **Devices**
5. **File formats**
6. **Games**
7. **Miscellaneous**
8. **System administration**

Sometimes you will need to know this to find the man page you are looking for. For example, there is a user command passwd that can be used to change your login password. If you type man passwd you will get the man page for this command, since it is in section 1. However, there is also a file called "passwd" that stores the password database on your system. The format for this file is explained in a man page in section 5, File Formats. To get to it, you need to type man 5 passwd so the man command will look in section 5 rather than starting at section 1.

Man pages are often very detailed and might tell you far more than you wanted to know. If you just want a quick idea of what a command does, use the whatis command. For example, whatis grep returns

```
grep, egrep, fgrep (1) - print lines matching a pattern
```

This shows you that grep, and its related commands egrep and fgrep, have man pages in section 1, and are used to "print lines matching a pattern". If you were searching for a command to copy files, you would know that this isn't it and you could move on. Or you could consult the man page for details on using these commands.

Related to the whatis command is apropos, which searches the whatis database for keywords. If you know what you want to do but don't know the command, apropos will give you list of related commands. For example, if you want to copy files, try apropos copy and get

```
bcopy (3)     - copy byte strings
copy (l)      - copy data to/from a class from/to a
                Unix file
copysign (3)  - copy sign of a number
cp (1)        - copy files
cpio (1)        copy files to and from archives
dd (1)        - convert a file while copying it
dvicopy (1)     produce modified copy of DVI file
fcopy (n)     - copy data from one channel to another
```

Your list will probably be much longer than this, but by reading through it you will find that the command you want is cp for copying files.

If the apropos and whatis commands don't work on your system, it may mean that the whatis database has not been created or is corrupt. You can rebuild it by running /usr/sbin/makewhatis as the system administrator (root). Note that the apropos command will accept only one parameter. You cannot search for multiple keywords. If you try, only the first will be used. The whatis command will accept multiple search words, but searches for them individually rather than as a group (in other words, combining them with OR rather than AND).

For broader documentation, check the directory /usr/doc on your system.

Table 1: DOS to Linux translation

DOS/Windows command	Linux equiv	What it does
cd	cd	Change the current directory. Similar syntax
cls	clear	Clear the terminal screen
copy	cp -i	Copy files. Similar syntax. Without the -i, cp will not prompt for destructive actions like file replacement
delerase	rm -i	Delete files. Without the -i, rm will not ask for confirmation
deltree	rm -R	Delete a directory and all its contents, including subdirectories
dir	ls	List the files in the current directory, or a named directory
md	mkdir	Create a new subdirectory. Similar syntax
mem	free -t	Display a summary of current memory usage and availability
more	moreless	Display the contents of a file one page/screen at a time. The less utility makes scrolling back and forth easier
move	mv	Move a file. Similar syntax
rd	rmdir	Delete an empty subdirectory. Similar syntax
ren	mv	Rename a file or folder
type	cat	Display the contents of a file
ver	uname -sr	Display the name and version of the OS kernel

TIPS

Applications for all occasions

How to install new software with RPM...

With Linux now happily on board, you need to know how to install and run applications. This is a little tricky, but luckily **Vince Veselosky** is here to help

Even though most Linux distributions contain hundreds or even thousands of programs, you will eventually find that there is some program you want that is not included. Installing new software is not quite as straightforward as slipping in a disc and clicking "Next" several times, but it is not a difficult skill to master, either. Here are the basics.

First, installing software is normally a task for the root user. It requires write access to areas of your system that normal users should not touch. For this reason, you will normally need to become Super-User to install new software.

You can do this by logging on as the user root or by using the su command. Then download the software you are looking for, or copy it from the CD you are using, into the root directory.

Most software for Linux will be wrapped in some kind of "package" which needs to be unpacked and installed on your system. There are several different package formats to choose from (Linux is all about choice). For Red Hat Linux, the preferred package format is RPM, the Red Hat Package Manager. The RPM format is also used by other Linux distributions such as Caldera OpenLinux, TurboLinux, and SuSE Linux. The command line utility RPM can be used to install these packages.

RPM in action

Let's say you have downloaded a new game called Widgeteer in RPM format. It comes in a file called widgeteer-1.0-1.i386.rpm. The name of an RPM file can tell you a great deal. Here we can see that the package contains Widgeteer version 1.0. The -1 indicates a version of the RPM package, rather than the program contained therein. The i386 means this is a binary package that has been compiled for the Intel 386 architecture.

To install Widgeteer from the command line or from a shell window in KDE, type the following

```
rpm -ivh widgeteer-1.0-1.i386.rpm
```

The command options used are:

- **i** – tells RPM to install the package
- **v** use verbose mode, so that RPM will tell you what it is doing
- **h** –-print hash marks as a progress indicator

Like most Linux commands, RPM is quiet by default. Verbose mode helps to give some feedback, so that you know whether the operation succeeded. If this output still seems sparse to you, you can try adding a second v to the command options. This will cause the command to be doubly verbose, and it will tell you more than you ever wanted to know. The hash marks make a convenient progress indicator on slower systems, but it is perfectly all right not to use this option.

The RPM utility can also be used to upgrade an existing package. Say, for example, that you got the new Widgeteer 1.1 package to fix some bugs. Upgrade with this command:

```
rpm -Uvh widgeteer-1.1-1.i386.rpm
```

The U option tells RPM to "Upgrade" the package. Trying to use "Install" mode would fail, because the package is already installed. Install mode will not overwrite an existing package (unless forced to do so). Upgrade mode checks the version of the existing package, and if it is older than the one being installed, the older package is removed and the new one installed. If the package is not already installed, Upgrade mode will install it as if using Install mode.

Suppose you play with Widgeteer for a while and decide that it just isn't for you. The RPM utility can remove it for you with this command:

```
rpm -ev widgeteer
```

The e option to RPM puts it in "Erase" mode for removing software. Note that when removing a package, you only need to give the name of the package, not the name of the RPM file it was installed from.

The RPM utility has many other uses as well. For example, you can see a list of all the packages installed on your system with the command:

```
rpm -qa
```

Read the man (manual) page for RPM to learn more, or visit www.rpm.org. There are also some graphical tools available that act as a front-end to RPM. In particular, look out for "Gnorpm" for the GNOME desktop and "kpackage" for KDE.

Getting to grips with tar

The name "tar" is short for Tape Archive. This is the least common denominator in packaging. All Linux distributions can read a tar file, as can any version of UNIX or its kin. A tar file is just a bunch of files appended end to end into one big file to make transfer and archiving to tape easier. Usually the output is filtered through the GNU Zip program gzip to reduce its size, since there is no compression built into the tar format.

To unpack the tar archive "software.tar", use the following command:

```
tar xvf software.tar
```

If the archive has been gzipped, it will have a .gz extension appended to it. You will need to unzip it with gunzip before running tar, or you can let tar do the work by adding the z option:

```
tar zxvf software.tar.gz
```

Once the archive is unpacked, look for a file called README or INSTALL. This will tell you what needs to be done next. Sometimes you can simply run the program from the place where you unpacked it. More often, though, there will be a shell script or program to run that installs the files where they belong on your system.

Occasionally you will find that a binary package is not available for your particular system. The archive that you download will then contain source code for the program you want. You will need to compile the source code to generate the program files needed to run the software.

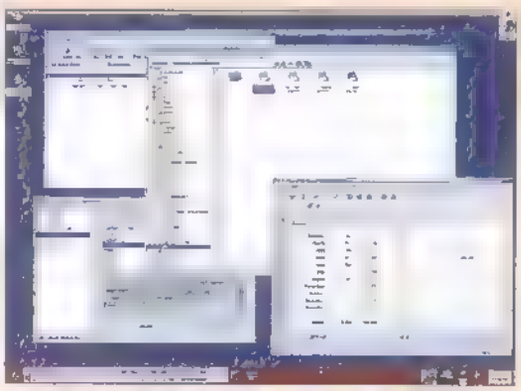
Almost all source code archives you will find for Linux use the GNU Autoconf tools to make compiling the software on new systems much easier. Always check the README file first, but most packages can be compiled and installed using the following three simple commands:

./configure
The "configure" script does a check of your system for libraries and such like, and generates a 'make' file based on what it finds.

make
The program 'make' is used by programmers to automate compiling source code into binaries. The instructions for make are stored in a makefile.

make install
After make has been used to compile the source code into binary program files, it is called again, this time with a new parameter, to install those files where they belong on your system. Again, the instructions for make are stored in the make file, this time in a special section called 'install'.

For most software packages, that is all it takes. You should now be able to run your new program! Good luck – why not try a few of the programs on our Cover CD?



To install and uninstall from GNOME, use Gnorpm

TUTORIAL

"Nurse! Scalpel! I'm going in!"

How to install and compile a new kernel

New Linux kernels appear all the time, so when it's time for a change, you need to know how to install it. **Rob Fenwick** dons his surgeon's gear and scrubs up for a heart transplant...

The name 'Linux' really only refers to the kernel, the heart of the operating system, and it's one of the most frequently updated components in Linux. But fear not, you don't have to be a top heart surgeon to upgrade your kernel. You do have to keep your wits about you while you're performing surgery as this is not an operation to be attempted lightly.

Before we dive into the technicalities of how to install a new kernel, ask yourself the following question: "Do I have a legitimate reason to upgrade the heart of the OS?" One is the appearance of a new kernel update – however if you're just mucking around, there's a chance you could do some real damage to your system; at worst, you could end up with an unbootable Linux partition.

While we'll do everything possible in this tutorial to ensure that this doesn't happen, there are so many hardware configurations out there that it's possible beginners could damage their Linux installation, so be warned

For the purposes of this article, we are assuming that you are running a PC with an Intel/AMD/Cyrix/Rise/Winchip 386 or above processor and that you want to install kernel 2.2.10 (the most recent stable kernel available at the time of writing). These instructions are valid for any kernel in the 2.x.x series - the only thing that differs is the filename of

the kernel 'archive' itself. The final thing that we assume is that you are booting your system using LILO (LInux LOader). This tutorial gives instructions on how to install a new kernel on both SuSE and Red Hat Linux systems.

The kernel is available for download at ftp://ftp.UK.kernel.org:/pub/linux/kernel/v2.2/. Download the file named **linux-2.2.10.tar.gz** and store it somewhere on your Linux partition, in the /root directory (For more information on partitions, see our feature 'Start here!' on page 16.)

Under the knife

We're going to move our new kernel to a folder called /newkernel. Naturally, to do this, we need to create the directory, newkernel.

Login to Linux as the root user and use the system console or load a command prompt in X whichever method you prefer. You need to be at a command prompt.

Enter the following commands:

```
cd /
mkdir newkernel
```

If you are on a Windows system, you would just have created a directory called C:\newkernel under Linux it's called /newkernel.

Now change directory to wherever your kernel ZIP file is. As our new kernel ZIP file is stored in /root, we'd type

```
cd /root
```

And here's our new kernel ZIP file – linux-2.2.10 tar.gz is the file we're after here.

Move the file to /newkernel like so:

```
mv linux-2.2.10.tar.gz /newkernel
```

Note at this stage that the filename changes with each release of the kernel. If you are not installing kernel 2.2.10, you should substitute the filenames given here for those appropriate to your version of the kerne..

Now change directory to the /newkernel directory:

```
cd /newkernel
```

Next, type the following command:

```
gunzip < linux-2.2.10.tar.gz | tar xfv
```

This unzips our compressed ZIP file kernel – it can take some time

Attach the arteries

The command that you've just entered will create a folder called /newkernel/linux, from which various other directories stem.

When your file is unzipped, and you are returned to a command prompt, type:

```
cd /linux
```

followed by one of these:

1. If you are running in X, Linux's graphical environment (similar to Windows), type:

```
make xconfig
```

2. If you are running in console mode, Linux's text console environment (similar to DOS), type:

```
make menuconfig
```

If either, or both, of these fall over and return you to a command prompt, then you have a problem compiling on your computer.

Probably the easiest way to remedy this is to re run the Linux setup and select everything in sight to do with development/programming. Or, if you know more specifically which files are missing, try downloading them from the Internet and installing them with an application such as glint or YaST (these come with Red Hat and SuSE respectively).

Decision time

So, assuming the above has worked successfully, you should now be looking at a screen that presents you with a series of options. You need to choose which options are correct for your PC and the hardware you have. So what you have to do is go through each category and decide what your new kernel should support, what it should support in a modular fashion, and what it should not support.

For example, your system may not require support for SCSI devices, or if you want to run 'sndconfig' under Red Hat to configure your sound card, you need to enable modular support for your sound system trial and error is the name of the game here.

In Xconfig or Menuconfig:

Y supports a device
M supports it in a modular fashion
N means there will be no support for that device in your new kernel

If in doubt, select 'N' and return to it later if it all falls over. If you select everything in sight, your new kernel will probably be too big for LILO to boot, and an unbootable kernel is not exactly useful.

Once you've finished choosing which parts of your new kernel you want to be included in the final build, exit the configuration tool

You must now do one of the following (Option A or Option B):

OPTION A

Enter the following commands in sequence:

```
make dep
```

to make dependencies

TUTORIAL

Installing a new Linux kernel

```
make clean
```
to clean up

```
make modules
```
to make all the kernel modules

```
make install
```
to install the new kernel files

```
make modules install
```
to make each of the modules install

```
make bzimage
```
to make the kernel image file itself

Each step takes a while

OPTION B

Type:

```
make dep;make clean;make modules;make install;make modules install;make bzimage
```

This is all one long command. This will do exactly the same as option A, taking the same length of time (it automates the process slightly). Both options, in fact, take some time. (On a 200MHz system it takes 30 minutes.)

After-care service

The final step is to move your new kernel to the /boot folder under Red Hat, or the top level folder under SuSE, and configure LILO to recognise it. Type

```
cd /newkernel/linux/arch/i386/boot
```

Your new kernel is in this folder, called bzImage. For Red Hat, type

```
mv bzImage /boot
```

or, for SuSE users, type:

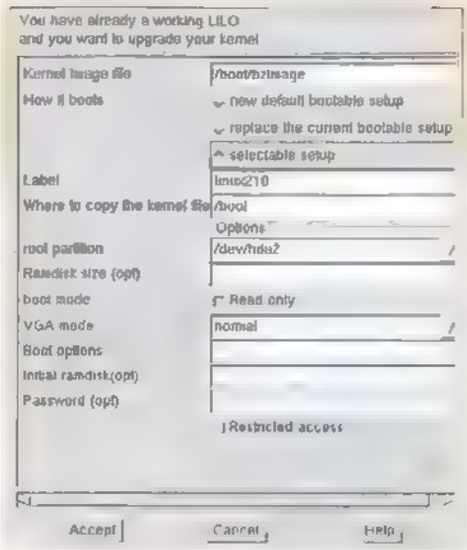
```
mv bzImage /
```

What you do next also depends on your distribution. Under SuSE, load YaST and select 'System Administration'. Proceed to boot options and select LILO configuration. Add a new LILO image, and specify that the kernel image can be found at /bzImage – call this new boot configuration linux210. Save and exit YaST.

Under Red Hat, open a command prompt window and type:

```
linuxconf&
```

Next, under boot mode, select a new kernel and



Once you've filled in the form, simply click Accept to proceed and your new kernel is nearly ready to roll...

complete the form as in the screenshot above. (Note: /dev/hda2 may be different on your system, so just put in whichever partition is relevant. We use /dev/hda2 because Linux is located in the second partition on our hard disk. If yours is on the third, say, you'd type /dev/hda3, or on a SCSI system /dev/sda3).

Now click Accept, then when asked if you wish to update LILO, select Yes followed by Quit.

If Linuxconf asks you to activate the changes, do so, then quit.

You are now almost ready to start using your new kernel. Simply proceed to a command line and type the following:

```
reboot
```

When LILO loads at startup, type linux210 followed by [Return]. If all is well, your new kernel will boot.

Success or failure?

If your new configuration seems to have gone belly up, you can most likely return to your original kernel by typing linux at the LILO prompt, and repairing your broken 2.2.10 kernel by starting this tutorial again from the top.

However, if your system boots without any difficulties, congratulations doctor, your heart surgery patient has made it through a very tricky operation! Run the system for a while, and when you're certain everything is as it should be, return to YaST or linuxconf, and make linux210 the default boot image to conclude the setup.

● You can find Rob Fenwick online at **http://nbsrfen.hypermart.net**

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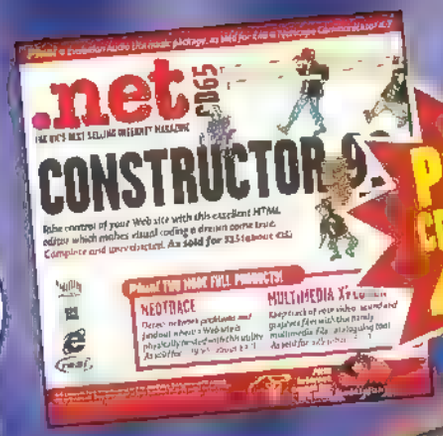

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TIPS

Tune up your Linux engine

How to have a faster, quicker Linux

Everyone wants the best performance possible from Linux. **Mike Saunders** shows you how to fine-tune it to perfection

Unlike the various other flavours of UNIX and recent versions of Microsoft Windows, Linux's system requirements are modest. You can squeeze the operating system into an old 386 box with just 4Mb of memory.

However, most modern distributions are not set up to give maximum performance; instead they are designed to provide support for a wide range of hardware and fit the average user's requirements. As such, many Linux systems are not achieving their full potential, and valuable resources like memory are being eaten by programs that never get used.

We'll take a look at some of the things you can do to give your Linux box a performance boost Memory is also very important to the performance of Linux, so we'll concentrate on tips to free up more RAM. We'll also look at a few ideas for increasing speed in the X Window System

Sort out your RAM

Before you start tinkering, it's best to check that Linux is working well with your RAM. Kernel versions 2.0.36 and before could have problems identifying the amount of memory in your machine. This appears to have been resolved with the recent 2.2.x kernels, but if you're running an older version, or are still having memory difficulties, then you need to pass an extra parameter to the kernel (using your boot loader, eg LILO or LOADLIN)

Check your startup messages – or view them when booted using the 'dmesg' command – and you will see a line showing the amount of memory

How to figure out memory usage

You can find out the current state of your system's memory using the 'free' command. Here's the output on our Linux box:

At first this can seem alarming – we're only running a text editor on our 32Mb machine, yet there's just 3.5Mb left! However, it isn't as bad as it seems. 'Buffers' refers to the amount of memory that's being used as a temporary store for disk-write operations, so it won't take any available space away from applications. Similarly, the 'cached' column shows the memory held by Linux's performance-boosting features such as read-ahead (reading data off the disk which may be needed next). So this can be added to your remaining available memory, too – see the results in the +/- buffers/cache row. The 16.9Mb it shows is a more reassuring figure.

You may also have noticed that the 'total' memory it displays is 30,584K, when 32Mb is actually 327,68K. The missing memory is being used by the kernel itself and some extra space it requires. To see the details in another form, use the command line options -b (bytes) or -m (megabytes). Adding -s n, where n is a number, will keep updating and displaying the memory information every n seconds.

recognised. If this is lower than it should be, add the 'mem' parameter when booting. For example, in LILO you would enter:

```
linux mem=64M
```

to tell the kernel that all 64Mb should be used. Replace the '64' with the amount of RAM you have.

Sometimes systems run slower because extra memory isn't being cached properly. This is usually due to the type of motherboard or BIOS. This is rare, but if you do have problems, see if you can cache the extra memory in the system's BIOS setup program.

Set your swap space

Swap space can have a significant effect on the overall performance of your system, particularly when running many applications. The general consensus is that your swap space should be 2.5 times the amount of RAM in your Linux box. So, a 32Mb machine should have 80Mb of swap space. If your swap space is over 128Mb, you need to make two separate partitions and split it up.

Partitioning is still the fastest way of using swap space. Linux will swap to a file in the same way as Windows, but it's less efficient than a partition and you may notice a drop in speed. Writing to a swap file involves far more work and time than a dedicated partition, which is separate from the main filesystem

Remove unused consoles

Removing unused virtual consoles is an excellent way to free up more memory and speed up your system

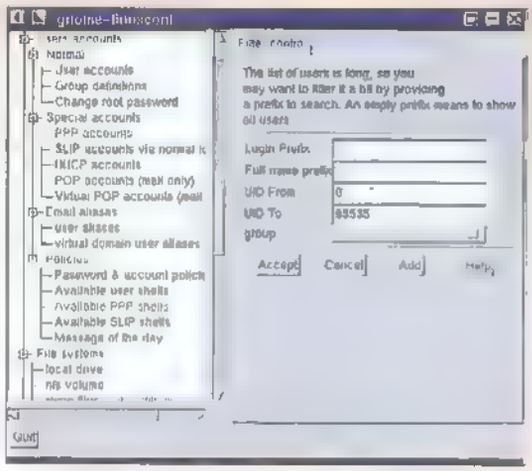
The major Linux distributions such as Red Hat and SuSE provide six consoles as default. If you do most of your work in the X Window System, then text-mode consoles just use up more memory. See 'How to disable virtual consoles' on page 83 for more details.

We removed three consoles, and kept three. This reclaimed about 1.5Mb of memory. Don't go overboard, though – X needs one free virtual console to run on. It's also best to have another one available in case of an emergency – such as killing X if your window manager freezes. If you ever need to create more consoles, just reverse the procedure in the boxout. The pattern of the lines is pretty clear.

Get rid of unwanted daemons

Another good way to gain more free memory is to cut down on the number of background processes running. The 'top' command shows a constantly updating list of the processes and their memory usage. Most of these are in the form of daemons – small programs that stay in memory and perform tasks depending on certain conditions.

Most Linux packages have a lot of these set up by default, but many of them may not be used. 'Top' shows the amount of physical memory they're using (look under the 'RSS' column), so you can pick out the ones that may be slowing things down. To decide whether they are started or not, use Red Hat's 'linuxconf' utility ('setup' in 5.x versions) or SuSE's YaST tool (under 'Change configuration file'). Here are some of the more common ones:



Under Red Hat 6, Linuxconf lets you choose which services are started in each runlevel

sendmail – this memory-hungry daemon is responsible for routing email. If you deal with your messages by dialling up and using Web based clients such as Yahoo! Mail, you can safely disable this.

cron – as discussed above, this starts jobs at specific times. With some packages, eg SuSE, it's best to leave this running as it starts a clean-up and configuration script every day. Of course, you can choose not to run it and execute the daily script by hand.

lpd – the printer daemon. If you never print from your Linux box, then you can stop this.

Tune up your Linux engine

nfsd this is often started by default on many distributions. It's the Network Filesystem Daemon, so unless you need to mount and work with NFS filesystems, you can safely turn this off.

inetd – inetd is used in servers or systems that can be contacted using programs like Telnet. If you don't need to access any of your computer's services remotely, then you can disable this.

You may find other daemons running on your system. Press F1 in Red Hat setup or F2 in YaST to find out more information on a service and whether it's safe to remove it. Be careful, though. daemons beginning with 'k' are usually important kernel services, so it's best to leave these running. They include 'kswapd', 'kerneld' (in 2.0 x kernels) and 'klogd'. 'syslogd' should also be left activated, as it provides critical system logs.

Build your own kernel

Perhaps the best way to give your machine a speed boost is to build a new kernel. If you're a competent Linux user and you're still running the kernel supplied with your distribution, we recommend that you install the kernel source code and compile your own (see page 66). Recent kernels are supplied with simple graphical setup programs to make tweaking and tuning very easy indeed.

By building a new kernel you can cut out a lot of the device drivers, protocols and other bloats that are built into the packaged ones. This not only makes the kernel smaller and saves memory, but it also boots and runs faster, needing less CPU cycles.

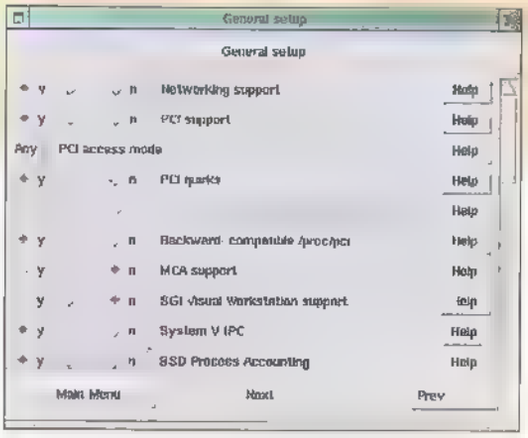
Choosing to compile many drivers and functions as modules seems like a good idea initially, as the kernel will be smaller and take up less memory However, the downside is that modules take longer to load than built-in kernel functions. The loading delay is small and won't be immediately obvious, but if you've chosen modules for a lot of drivers and use them frequently, you may find them sluggish.

The best compromise is to compile drivers you commonly use directly into the kernel and leave the others as modules. For example, we only dial up our ISP once or twice a day, so we've compiled PPP support as a module.

Be ruthless

Many distributions include RAM disk support as standard with their out-of-the-box kernels. Luckily, the RAM disk doesn't allocate a chunk of memory and wait for it to be used – it grows dynamically as more space is required – but it still adds weight on the kernel. It's unlikely you'll need support for this, as it's mainly used for loading installation/rescue disks when the hard drive can't be accessed.

Being ruthless and chopping unwanted features out of your kernel can make a noticeable difference to your boot time and overall system performance. Go through every item in the 'menuconfig' or 'xconfig' programs and decide if you'll ever need it.



make xconfig provides a simple graphical interface for tweaking kernel configuration

The online help with these configuration tools gives typical situations where a feature would be needed, which helps you to get a good idea on its suitability for your machine.

Boost performance

The X Window System uses up a considerable amount of system resources, and it too can be tuned to give better performance. Before doing anything, though, check that your X setup isn't providing more than you need. If you've got a 32- or 24-bit colour X server setup, but you don't do any detailed graphics work, you can free up a lot of memory by opting for a lower colour depth.

You can also save memory by setting the virtual screen size to be the same as the viewport. Take a look at the /etc/XF86Config file. If you spot a 'Virtual' entry in the 'Display' subsection of the 'Screen' entry, your X display will show a small part of a larger area.

This means that X has to keep track of graphics output that isn't even on the visible screen and, in so doing, uses up extra memory. Utilising your window manager's virtual desktop/workspace functions is a

Tune-up information on the Web

There's plenty of information on the Web for fine-tuning your Linux box Take a look at these sites:

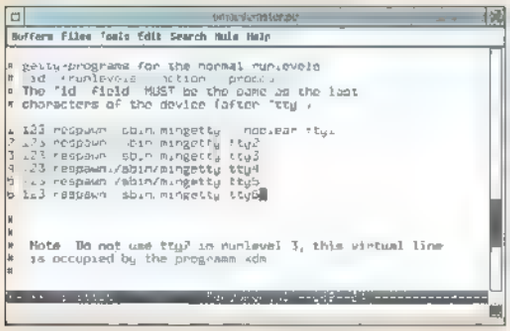
www.linux.com/tuneup/
Linux.com features reader suggestions for many categories including networking and X, and these are mainly specific to individual applications.

tunelinux.com
This dedicated site is also arranged into sections and has useful links to newsgroups and other pages.

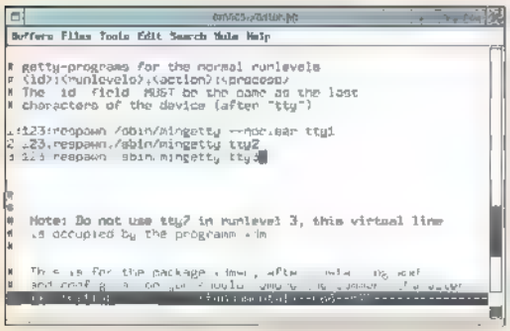
Give Linux a kick-start

How to disable virtual consoles

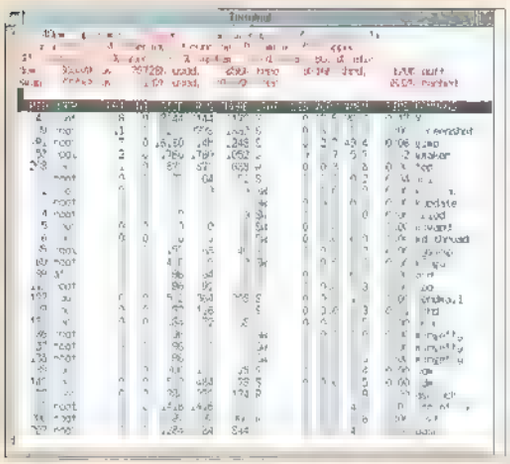
It may seem like an unusual idea, but disabling virtual consoles can give you a small performance boost, especially if you are running Linux on older hardware. Follow our three-step guide.



1 Load /etc/inittab into any text editor and look for lines that launch 'getty' terminal programs, eg 2:123:respawn:/sbin/mingetty tty2



2 Starting from the bottom, remove a line for each console you want to disable. The number straight after tty identifies the console



3 Save and reboot. Now try switching to the disabled console – there should be no login: prompt. The process list here shows our three remaining mingettys running

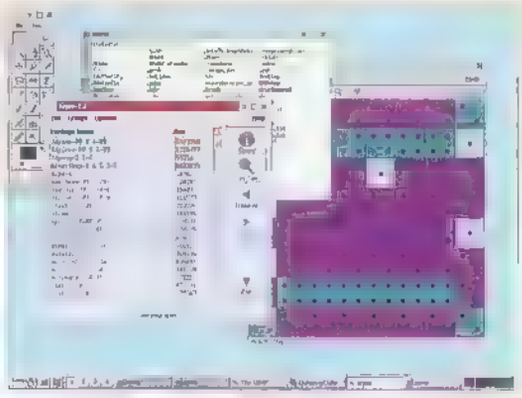
much more resourceful way of getting some valuable extra screen space. The /etc/XF86Config file also holds the hardware configuration, including monitor refresh rates and video card memory. Graphics hardware varies too much so we can't be specific here, but if you've got an esoteric graphics card or monitor and the standard setup tools (like XF86Setup or SuSE's SaX) can't set it up properly, then editing this file may get your X server performing to its best.

Find alternative software

Of course, the software you use will be responsible for depleting your system resources. Changing some of your common tools for lighter replacements is initially a simple idea, but the trouble usually lies in finding suitable alternatives.

A change of window manager is definitely a good start. The variation in memory usage between different WMs can be drastic - especially when taking into account the recent desktop environments like GNOME and KDE. They're both very powerful and feature-packed, but most of us don't need all the features they offer (and the memory they use!).

If you like the Windows 9x style, IceWMne is one of the best alternatives. It's small, fast and themeable and includes Win95, OS/2 and FVWM styles. For a truly different desktop, try Window Maker, which is also fast and has a small memory footprint.

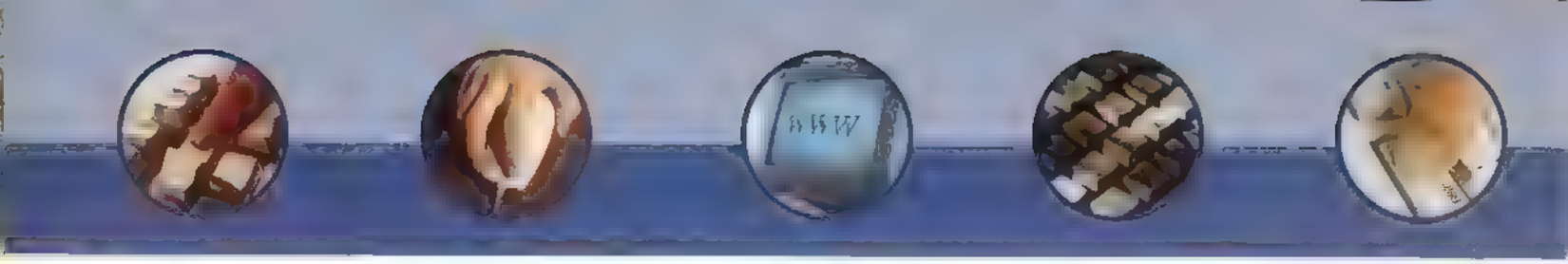


Try IceWM for a fast and small alternative to the memory-hungry desktop environments like GNOME and KDE

Tune your window manager to eat up less memory. The configuration files for many window managers have options to turn off icons, cut down on the number of colours used and so forth. Disabling dithering and using a plain or tiled background is much more resource friendly than a full-screen image.

For other software alternatives, Lynx is a good text-based Web browser that needs far less memory than Netscape. It also runs considerably faster, partly due to it never having to load images. Arena is X-based, but is still quite small and fast (and has very powerful HTML checking).

Emacs is usually installed by default on most machines and while its power and features are superb, for many simple editing chores it can be cumbersome (particularly on older hardware). Some replacements could be Joe, Jed or Pico the last based on Pine's message composer.



technical support

Got a problem? Linux guru Dave Coulson is your man with the answers

Dave Coulson is one of the UK's top Linux problem-solvers. Catch him online on the pcplus.linux newsgroup

Networking made easy

How to set up a simple peer-to-peer network

Q I have two dual-boot Windows/Linux boxes which are on a network when in Windows. I'd like to be able to share files between the two when booted into Linux.

A First, check your IPs are correct. If you want to access the internet with your network up, you'll need to ensure that the IPs you use are from one of the three classes of internal IPs.

192.168.0.0 – 192.168.255.255
172.16.0.0 – 172.31.255.255
10.0.0.0 – 10.255.255.255

Usually, 10.0.0.x netmask 255.255.255.0 is used, so you can call your two boxes 10.0.0.1 and 10.0.0.2 and you'll know you won't have to reassign them later.

You'll need to know the exact model name of your network card so you can compile drivers for it. If you're not sure, compile a few as modules and see which one works. Booting into Windows will help you identify the IRQ and I/O base used by your card.

Reconfigure the kernel (see page 66), preferably with modular ethernet support, build and install the modules. Then run 'depmod -a' to create the dependencies for the new modules. You will then be able to 'modprobe' the module for your card (the linux/Documentation directory will have documentation about the exact options needed for your card).

Once it's initialised correctly, you need to assign an IP to it. You can either use the same IP as you did in Windows or you can pick another one specifically for Linux.

ifconfig eth0 10.0.0.1 netmask 255.255.255.0 up

This will auto set up a route for the subnet, so you can now ping that IP. If the other box is set up correctly, also try to ping that system. If it doesn't work, you may have to change jumpers on the card or use a different module.

For file sharing you have two options. You can either install SSH (Secure SHell) on to both systems and copy files between the two or you can use NFS (Network File System) on both systems and mount remote directories. You'll need to install portmap as well as the nfsd and the nfs client

Vrooming up Linux...

5 ways to make your Linux installation that little bit faster

1 Use an optimised compiler
Installing a compiler, such as egcs, which has been enhanced for your CPU, will produce a small increase in speed.

2 Don't run services you don't use
Most distributions install servers such as Apache and sendmail. If you don't need these, remove them with the package manager.

3 Use more minimal programs
If you're short of memory, run a more minimal window manager to stop your box using swap space.

4 Use mtrr (PPro/PII/PIII only)
Enabling mtrr for your video card can result in a 20% speed increase in X Windows.

5 Build your own kernel
Not only can you include extra options which will speed up specific system parts, but you can also build the kernel with an optimised compiler.

You'll find more speed tips on pages 70-73

Building an Apache intranet

How to compile Apache modules

Q After looking at various sites, it seems that Php and Apache would be the best option for my intranet server. My problem is: how do I compile Php as a shared module for Apache so that I can upgrade it more easily?

A If you've already got Apache installed, remove it either with RPM or by deleting the directory that holds the Apache binaries (usually **/usr/local/apache**).

If you want to add Php to a current copy of Apache, you can skip to step 3, but check you have the latest version of Apache installed and that it has **mod_so** compiled into it.

To check for **mod_so**, run **./httpd -l** from the binary directory of Apache. If it lists **mod_so.c**, then you don't need to recompile it.

Step 1. Configuring Apache

Download the latest version of Apache (1.3.9 at the time of writing) from **www.apache.org** and untar it:

```
tar xvzf apache_1.3.9.tar.gz
cd apache_1.3.9
```

If you want to have SSL (Secure Socket Layer) or any other non-DSO (dynamic shared object) extension, now is the time to run its configure script. Before configuring Apache, check **www.apache.org/** for any extra options you may want to add. However, the minimum options should be:

```
./configure --enable-module=so
```

This will enable the Apache module, which allows the loading of DSOs at runtime.

Step 2. Building Apache

A simple

```
make && make install
```

as root will install Apache. You can then run it by:

```
/usr/local/apache/bin/apachectl start
```

and trying to connect to **http://127.0.0.1/** with Netscape or Lynx. Continue if all is well; otherwise check any error output to see why it's died.

Step 3. Configuring Php3

Download the latest version of Php3 from **www.php.net** (3.0.12 at the time of writing) and then untar it:

```
tar xvzf php-3.0.12.tar.gz
cd php-3.0.12.tar.gz
```

Now we need to find the location of the 'apxs' binary. If you compiled it, it is usually located in **/usr/local/apache/bin/apxs**, but it could also be in **/usr/apache/sbin/apxs**. A quick **locate apxs | grep apache** should find it for you.

The exact configure options for Php depend on the database you use (if you're using one) and any libraries you want Php to use. The minimum should be:

```
./configure --with-apxs=/usr/local/apache/
bin/apxs --without-gd \
--enable-sysvsem --enable-sysvshm -- enable-
track-vars \
--enable-memory-limit --enable-safe-mode
```

Step 4. Building Php

A quick:

```
make && make install
```

will build Php and copy the **.so** to **/usr/local/apache/libexec** (or wherever Apache was installed). It should also add a

```
LoadModule php3_module
libexec/libphp3.so
```

line to **httpd.conf**.

Step 5. Adding extra options for Php to httpd.conf

First, we need to tell Apache which file types to parse out for Php content. In your httpd.conf (or whichever configuration file has the MIME type configurations) add:

```
AddType application/x-httpd-php3 .php
AddType application/x-httpd-php3-source
.phps
```

Obviously, you may want to use .php3 or .phtml, so either alter or add to the list.

Run **/usr/local/apache/bin/apachectl start** and Apache will start up with php support.

Step 6. Testing Php

A quick **.php** file in **/usr/local/apache/htdocs/** should be enough to test Php, but if you've got support for databases or image libraries, you may want to check each of them.

```
<?php print "This is in php"; ?>
```

If it prints the string, all is well. If not, **View Source** for the page and see if it parsed out the **<?php ?>** tags, as your extension may not match the httpd.conf configuration.

Good luck!

packages. For example, if you want to mount /home/users/mp3 from the 10.0.0.1 box on the 10.0.0.2 box, you would put the following line in /etc/exports on the .1 system:

```
10.0.0.2/home/user/mp3(ro)
```

then restart the nfsd (by running the /etc/rc.d/init.d/nfs restart script or killall -HUP rpc.nfsd). We have set it to be read-only, but it could have been mounted read/write (man five exports for more options). Then, on the other system, do:

```
mount 10.0.0.1:/home/user/mp3 /mnt/mp3s
```

and then you can use that directory as if it were local to the system.

Mail handling

How to get unlimited e-mail addresses with Freeserve and fetchmail

Q I use fetchmail to fetch my mail from Freeserve's POP3 server, which works fine. However, I want to make use of the unlimited e-mail addresses provided.

I'd like it to work like this:

- Addresses are in the form <localnamc>@<usernamc>.freeserve.co.uk
- I want to pick up all messages for <username> – this happens okay
- I want to split to separate recipients on <localname>
- I want local aliasing to be invoked when delivering to <localname>
- I want undeliverable <localnames> to go to root

A As you can fetch all the mail from that account, your copy of sendmail must have been configured properly, so collecting the mail must be a fetchmail issue.

At the moment, you'll be using a line in your **~/.fetchmailrc** similar to:

```
poll pop3.freeserve.net protocol pop3
username <username>.freeserve.co.uk
password <password> to <localuser>
```

which will deliver all mail from that single account to the user **<localuser>**. Change it to:

```
set postmaster "root"
```

LINUX ANSWERS QUICKIES

Separating commands with **&&** will stop execution if one of the commands fails

technical support

```
poll pop3.freeserve.net nodns with proto
pop3 localdomains
<username>.freeserve.co.uk user
<username>.freeserve.co.uk there with
password <password> is * here
```

The **set postmaster** line sets the default user for mail, if the username doesn't exist locally, although you'll probably want to alias root to your personal account, so you don't have to be root to read the mail it gets.

The poll line is very similar to the original, but we've set a local domain for the users.

This makes fetchmail deliver the mail to those users as if they were local to the server.

The 'nodns' addition stops it looking up hostnames for mail which is not for that specific domain name.

System administration

How to get root access when you forget your password

Q I've just installed Linux, but I can't remember what I put in for the root password. Is there a way to reset this password because I don't want to go through the process of reinstalling the whole thing again.

A You can get root access by typing the following at the LILO prompt:

```
linux 1
```

and once the system has booted up, you'll be presented with a root prompt from where you can run 'passwd' and change it or edit the /etc/passwd file with a text editor and remove the password for the root user (you probably won't be able to run X in runlevel 1 as the only partition that is mounted is /).

Obviously, you don't want people doing this sort of thing, so adding the following lines to your /etc/lilo.conf will prevent this:

```
restricted
password=somepassword
```

Just remember to rerun /sbin/lilo after altering this file. This will make LILO ask for a password when you try to pass options to it, so they can't make the system boot up in different run levels. Make sure this file is owned by root.root and it only has 600 permissions:

```
chown root.root /etc/lilo.conf
chmod 600 /etc/lilo.conf
```

LINUX ANSWERS QUICKIES

Rather than quoting files with spaces or apostrophes, use \ to escape the space

Drive mounting

How to mount MS-DOS partitions

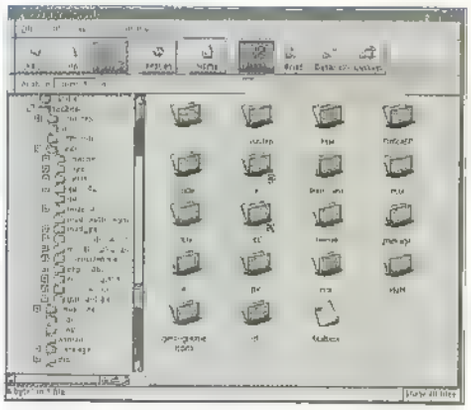
Q I dual boot Windows and Linux, but I have to mount my DOS partition each time I boot up. How can I make it mount the partition automatically when I boot up?

A You need to add a line to /etc/fstab, similar to the following:

```
/dev/hda1 /mnt/dos vfat
auto,noexec,umask=0002  0  0
```

That means, mount /dev/hda1 (usually C:) in /mnt/dos using the vfat filesystem so you get long filenames. The list of options forces it to be mounted on boot; now set the exec bit on any files and make files readable and writable by the root user and the root group.

If you'd like other users to write to the drive, add **gid=103** where 103 is the group of users you want to allow write access to.



GMC provides you with a simple, graphical way to organise your files

Partitioning methods

How to partition a drive effectively

Q I have a 4.2Gb IDE drive which has three FAT partitions on it. I want to install Linux into the last two, leaving 2Gb for Windows, but I don't know if I should create more than two partitions. What's a good partitioning strategy?

A Depending on what you are going to do with the installation, the partitioning methods can change, but overall it's best to create more than two partitions, so you can keep your home directories, mail and downloaded items should you ever reinstall. Given 2.2Gb to play with, the following partitions should prove adequate

```
50Meg = /
100Meg = /tmp
64Meg = /var
600Meg = /home
```

Distribute the rest between swap and /usr depending on how much RAM you have in your system, but 128Mb of swap won't go amiss. You may also want to create a small (10Mb or so) /boot partition, which resides at the start of your hard disk if you think you'll have problems booting beyond the 1,024 cylinder limit.

LINUX ANSWERS QUICKIES

Use **shutdown -rnf 0** to reboot without checking the partitions

How to configure sound cards

Sound in Red Hat 6.0

Q I am using a SoundBlaster 16 (the one with the Wave port on it). I used to have it in the kernel but I was wondering if the support is in a module in the default install of RH6.0?

A With a standard SB16 card, you need to compile 'Sound Blaster' support as a kernel module, which will give you an **sb.o** module (if you don't reboot, remember to run **depmod -a**). You may also want to build the **opl3.o** module for synth music. To initialise the module, simply:

```
modprobe sb io=0x220 irq=9 dma=0 dma16=6 mpu_io=0x300
insmod opl3 io=0x388
```

Obviously, you'll have to enter the correct values for your card. To check that everything's worked out properly, do **cat /dev/sndstat**. A good place to turn for sound information is **/usr/src/linux/Documentation/sound**

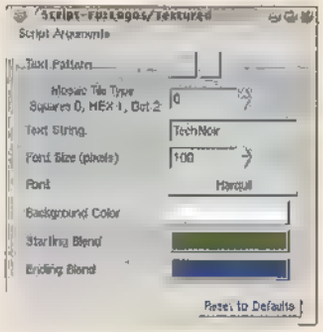
How to create a Web site header using GIMP

Q How can I quickly create a simple, yet attractive, title image for my Web site using Linux?

A The ideal tool for creating graphics is GIMP, which you'll find on our CD-ROM (also see pages 50-55 for a tutorial).

Step 1. Decide how large you want your title to be

Depending on how your page is structured, you may want a small square title or logo for a corner or a central rectangular textual title. Once you've got a rough idea of size, create an image in GIMP using the **File > New** menu, but make the image slightly larger than the final image will be so you've got a little room for experimentation.

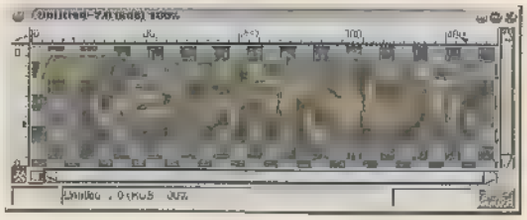


Step 2. Pause to admire what you've just created

If you did the above, you should now have something that looks like the following. It's now time to fancy it up a little.

Step 3. Pick the colours

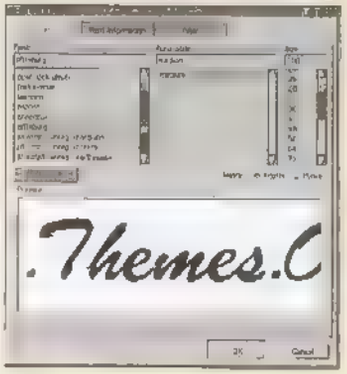
If you've got a plain coloured background, simply flood fill the image with that colour; otherwise pick a base colour from your tile.



Step 4. Add the central object

This could either be the main name of your site or a logo. If you want something a little more interesting, have a look at the Script-Fu options (**Xtns > Script-Fu > Logos**) to see if anything there helps you. For our logo, we use the 'Textured' script with 100pt Harquil font text. If you don't have the Harquil font, it's available from **www.gimp.org**. Now the image has been created, remove the lower layers using the **Layers > Layers + Channels** menu (right-click on the image), then **Merge the Visible Layers** using the menu on the **Layers + Channels** window.

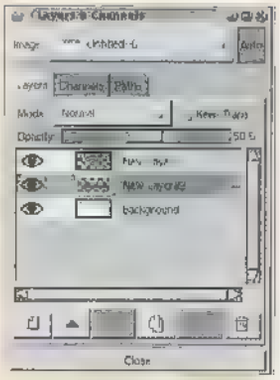
After adding a channel to what will become our Web site logo, paste the created text into it, then anchor it using **Ctrl-H**.



Step 5. Adding extras to the image

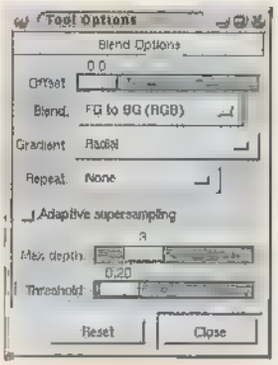
Before adding extras, create another layer on your image, so you can manipulate the parts without moving anything that you're happy with.

For our first extra, we added a simple text object of the domain name of our site. After anchoring it, we reduced the transparency of it to around 50 per cent. We then moved the main part of the title to the front, obscuring the extra slightly. Next, we added a 'Layer Mask' to our main logo layer, setting the default as white.



Step 6. Create a radial blur

Then, using the gradient tool, we created a radial gradient, with the centre in the middle of the logo and in white, and the outer in a light grey and ending at the horizontal edge of the image. Experimenting with various types of gradients and colours will eventually produce the result you want. We then applied the mask to the layer.



Step 7. Adding some graphics

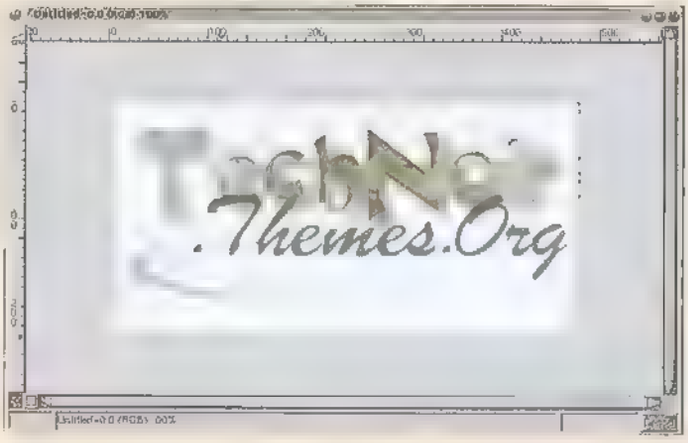
We added two more layers and then created an ellipse-shaped object in the lower layer and coloured the selected area. An identical ellipse was created in the upper layer but coloured in white.

Then, ensuring we'd selected the upper layer and the Move tool, we moved the white ellipse up and slightly to the right, giving an effect similar to that in the example. Adjusting the transparency for the coloured layer can produce a softer feel to the graphic.

Step 8. Producing the final image

At this stage you'll probably want to save your creation as a .xcf, which is the image format used by the GIMP when you want to retain the layers and masks, so you can adjust individual layers in the image with ease later.

When you're sure your creation has been saved, **Layers > Flatten Image** and either save it as a .jpg or go to **Image > Indexed** and then save it as a .gif



Your final Web-ready image – easy, eh!

technical support

System security

How to avoid always being root

Q If I want to shut down or reconfigure a network card, I either have to su to root or login as root. Although this works, I know it's considered bad practice to be root for too long. Is there a way to do things as root without actually logging in?

A **Option 1:**
Rather than suing to root, and then running the command, run the command through su, as follows below:

su – -c "shutdown -h 0"

and this will shut down the system.

Option 2:
A far more expandable and secure method is to use 'sudo', which is available from www.freshmeat.net. With this you can allow specific users or groups to run selected programs as root. One of the main reasons this is more secure is that you don't have to type in your root password to use it.

Once you've downloaded and installed sudo, either run the visudo program or, if you think that no one will use your system while you're editing the file, you can use another program to edit /etc/sudoers. The example sudoers file is very well commented, so you should have no problems setting it up, but be sure you know who is in a specific group if you allow an entire group to run a set of programs (although you can deny access on a per-user basis). Also, if you want to use programs such as shutdown or ifconfig, you will need to add the paths /sbin and /usr/sbin to your PATH variable, like this:

export PATH="$PATH:/usr/sbin:/sbin"

TrueType fonts

How to use TTF fonts in Linux

Q I have a large collection of TrueType fonts in Windows and I would like to use them in Linux. Is there a way to use TTF fonts in X Windows?

A The simplest way to do this is to run a second font server called 'xfstt' obtainable from www.freshmeat.net. Once you've downloaded and installed it, copy all your TrueType fonts to /usr/ttfonts, but you can have them somewhere else using the --dir=/path/to/ttfonts option. Once that is done, do:

xfstt --sync
xfstt &

then in X, do:

xset fp+ unix/:7100

From now on, the fonts will be available from any X application, such as Netscape or WordPerfect. If you want it to use xfstt fonts all the time, add the following line to your XF86Config file in the 'Files' section:

FontPath "unix/:7100"

then restart X to check it's worked.

Alternatively, if you run Red Hat 6 or another distribution that uses xfs with the TrueType patches, you can just add the directory of ttf fonts to your /etx/X11/config/fs file, cd to that directory and run 'ttmkdir'. Then do a ln -sf fonts.dir fonts.scale and, finally, restart xfs with /etc/rc.d/init.d/xfs.

LINUX ANSWERS

Logging in without the command line

How to configure a graphical login

Q Until now, I've been running X using **startx** from the command line. I've noticed that many systems let you login from X, so you don't have to mess with the command line. How do you do that?

A You need to configure your system to run a display manager at boot time. There are many available, including xdm, gdm and kdm. Here we'll concentrate on xdm as everyone is bound to have it.

Step 1. Check xdm runs

Kill off X if it's running and type **xdm** at the command line as root. If X starts up and you get a big window in the middle asking for a username and password, then it works. If not, examine the error messages to find out why.

Step 2. Make it pretty

The default xdm looks pretty horrible, so you probably want to spice it up a bit. Edit the **/etc/X11/xdm/Xsetup_0 file**, which is executed when you run xdm. You either need to set up a PATH variable or use absolute path names in this file. Remember, at each stage you can run xdm to see what it looks like

Once you've decided which programs you want to execute at runtime, you'll need to edit **/etc/X11/xdm/Xresources** to change the colours and fonts used in the login window. You can either use a hex colour triplet or an X colour name for defining colours.

Step 3. Set Linux to run it at boot time

Now open your **/etc/inittab** and find the line that executes **xdm –nodaemon**.

x:5:respawn:/usr/bin/X11/xdm -nodaemon

Even if you don't use GNOME, gdm makes a rather simple display manager

The 5 means that line is used for runlevel 5, so further up your inittab find a line similar to:

id:3:initdefault:

and change it to

id:5:initdefault:

It may be runlevel 4 on distributions other than Red Hat.

I'd like to connect to the Web but...

How to troubleshoot a dodgy Net connection

Q I've been unable to get my Internet connection working under Linux. I've tried with Red Hat 5.1 and 5.2, but to no avail

A A variety of applications are available for configuring your Internet connection, including kppp and ezppp, but we'll be doing it by hand so we know exactly what's going on. We've set it up for Freeserve, but similar rules apply to nearly all ISPs that use PPP (Point-to-Point Protocol), so altering the scripts to fit shouldn't be too difficult.

First, we need a **/etc/ppp/options** file. This contains all the command line options you would normally pass to pppd such as which device to use and which script to run for a dialler.

/etc/ppp/options:

```
connect '/usr/sbin/chat -v -f /etc/ppp/chat-script'
asyncmap 0
crtscts
defaultroute
modem
lock
mtu 542
mru 542
115200
/dev/modem
```

Ensure that **/dev/modem** is symlinked to the correct **/dev/ttySx** device – this is a lot easier than changing all your configuration files later if you move your modem to a different com port.

Next, we need a dialler script – you will need to adjust this for your ISP.

/etc/ppp/chat-script

```
ABORT 'NO CARRIER'
ABORT BUSY
'' ATF1
OK ATDT08450796699
CONNECT ''
ogin: USER.freeserve.co.uk
word: PASSWORD
```

A chat script is a list of expect and replies. For example, once we have received **OK**, we will send the dialling command to the modem. With Freeserve you use **USER.freeserve.co.uk** for your username; others will just use your username. You could try connecting to the ISP using minicom if you're unsure of what method your ISP uses, or you could ask your ISP for some information about manually connecting to them.

The last file you need is used for authentication. Most ISPs use PAP (including Freeserve), but some such as BT Internet use CHAP authentication. The only difference you need to worry about is that PAP settings go in **/etc/ppp/pap-secrets** and CHAP in **/etc/ppp/chap-secrets**. The format for both files is:

```
USERNAME SERVER PASSWORD
```

So, for your Freeserve account, you would use:

```
USER.freeserve.co.uk * PASSWORD
```

We have to use * as a wildcard, as at this point we won't have DNS working so we can't use ***.freeserve.co.uk** or similar. You also probably want to **chmod** all the **/etc/ppp** files that contain passwords to **660**, so normal users on your system can't find out what your passwords are.

At this point, you should be able to connect to your ISP by running **pppd** as root. Once we know the connection works, we need to configure DNS, so we can resolve domain names. ppp-2.3.8 and higher support the automatic setting of name servers from ISPs that tell you the server IPs when you login, which Freeserve does. If you don't have an ISP with that facility or you have an older copy of ppp, you will need to set up your **/etc/resolv.conf** (that's resolv, without an 'e') for your ISP.

The first line of your **/etc/resolv.conf** should be a list of domains to search. Unless you know what you're doing, you'll similarly want:

```
search .
```

to make it search everything. Next, you will need to set your domain name. For Freeserve, you would use

```
domain freeserve.co.uk
```

Now we have a list of nameservers. You can specify up to three nameservers, but you must ensure that you use the correct IPs. The nameserver configuration for Freeserve would be:

```
nameserver 194.152.64.35
nameserver 195.92.193.8
```

If you encounter problems when trying to connect to your ISP, do **tail -f /var/log/messages** as root and it will log all the PPP operations, although if you have an error in your chat script, you will need to edit **/etc/syslog.conf** to log **chat.*** to **/var/log/messages**. You may also see it trying to load modules such as ppp-compress-21 and similar. You need to add the following lines to **/etc/conf.modules**:

```
alias ppp-compress-21 bsd_comp
alias ppp-compress-24 ppp_deflate
alias ppp-compress-26 ppp_deflate
```

You may also get a **char-major-108** module error when using ppp-2.3.9 on a 2.2.x kernel, so add the following line to **/etc/conf.modules**:

```
alias char-major-108 off
```

Obviously, you don't want to type **pppd** every time you want to connect to the Internet, so you need a simple dialler application. Before you start looking for one, you will need ppp-on and ppp-off scripts. These probably came with your ppp installation package, usually in the documentation directory (**/usr/doc/ppp-2.3.***).

If they are there, copy them to **/usr/bin** as root. You should now be able to start and stop your ppp connection as root by simply typing **ppp-on** and **ppp-off**, which is what the diallers usually expect.

However, if you want to start and stop ppp as a normal user, you will need to SUID your pppd binary. As root, issue the following command:

```
chmod +s `which pppd`
```

You can now start pppd as any user on the system, but you can only stop it as either that user or root. For a dialler, I use the GNOME panel dialler applet, which is a simple pair of buttons which you click to start and stop the connection. Another option is to use a window maker dockable applet, such as wmppp, to do it.

Your complete Linux starter kit

Quit wondering if Linux is for you – load it and see for yourself. **Matt Kynaston** explains how to run these great applications

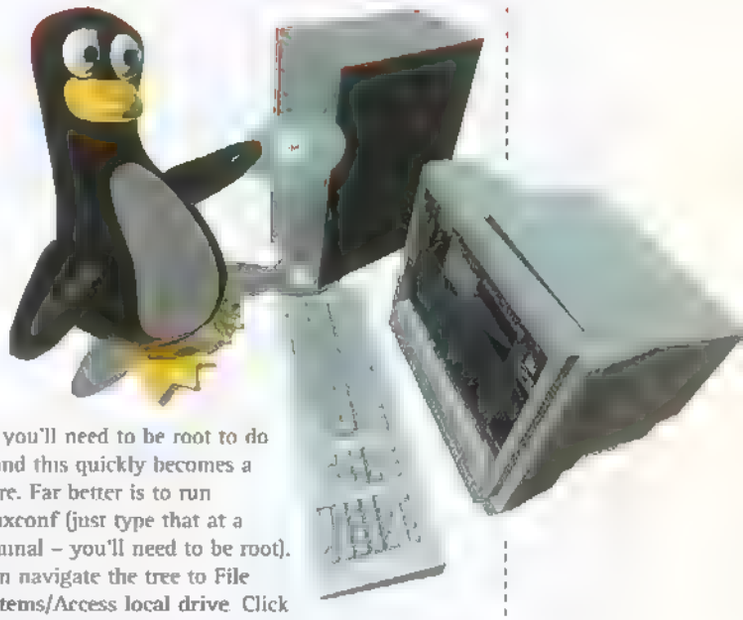
Now that you've installed Red Hat 6.0 from our Cover CD by following our 'Start here!' guide on page 16, it's time to discover some of the many applications that come bundled with it such as the GIMP image-editing toolkit and Apache Web server. See the installation guide on our CD for details of how to choose which of these you want. This also incorporates all the official updates that have been released by Red Hat.

In addition to Red Hat, we've added a few extra programs. They're in the /extras directory on the CD. In the root of the CD there's a file called index.htm which gives a basic introduction to the contents of the CD and outlines what you'll find and where.

Mounting your CD

Unlike Windows, in Linux you have to mount your CD-ROM by hand, to access the files on it. You can do that from a terminal window by typing:

```
mount -t iso9660 /dev/cdrom
/mnt/cdrom
```



but you'll need to be root to do it, and this quickly becomes a chore. Far better is to run linuxconf (just type that at a terminal – you'll need to be root). Then navigate the tree to File Systems/Access local drive. Click on the /dev/cdrom entry, select the Options tab, and click the User mountable box. Click the Accept button, then Quit. Activate the changes, then click Quit again.

Now any user can mount the CD-ROM drive. Before ejecting the CD, unmount it by typing.

```
umount /mnt/cdrom
```

Plus this top software

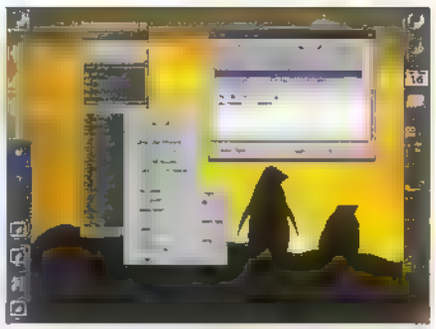
Missing a Windows game now that you've switched to Linux? Here's Unreal running under WINE in Linux

After squeezing WordPerfect on to the CD, we found we still had a couple of megabytes to spare. Rather than let them go to waste, we've filled them with a few of the utilities we use every day. They're all in RPM format, so are easy to install. Be sure to check the software's home page for extra information and instructions.

WINE

Dir: extra/wine
Web: www.winehq.com

WINE stands for 'Wine Is Not an Emulator' Clever perhaps, but not terribly informative. If you really must know, it's a Linux replacement for the Windows API. More importantly, it enables you to run Windows programs in Linux. Please remember, it's still under active development – it won't run absolutely everything, and it might even crash on you – but if there's a Windows program or game you can't live without, it's worth giving WINE a try.



Penguin chat with Licq. You can imagine the conversations

Licq

Dir: extra/licq
Web: www.licq.org

ICQ (pronounced "I Seek You") is an Internet chat protocol. And if you're a chatty type, Licq is well worth exploring. Get one-on-one advice from a Linux guru, ask what the weather's like in Moosejaw or trade salacious quips with mysterious strangers. But do remember, this program is still under development – it may not function completely as expected.

Imwheel

Dir: extra/imwheel
Web: solaris1.mysolution.com/jcatki/imwheel/

In our KDE tips article (p56), we mention a program called imwheel that enables you to use your wheelmouse with Linux. Well we've saved you the download by including it on the CD. See the article for instructions on its installation and use.

RealPlayer

Dir: extra/realplayer
Web: www.real.com/

Wish you could get streaming media over the Net from Linux? You can with this version of RealNetworks' G2Player.

LINUX

More RPMs than an LP!

You will find all the Red Hat apps (over 600!) in the **RedHat/RPMS** folder on the CD. To install one, mount your CD-ROM drive, then type:

cd /mnt/cdrom/RedHat/RPMS

find the name of the package you want, then type:

rpm -Uvh <package name>

to install it. You can abbreviate the package name using the * wildcard to save typing out all the version number. For example:

rpm -Uvh xtrojka*

Installs xtrojka, a Tetris-like game. See page 64 for more details.

How Corel makes Linux easier to use

Corel WordPerfect 8 for Linux

Corel's WordPerfect word processing program has garnered much respect from the Windows community for its power and ease of use. Earlier this year Corel made it available on Linux, and it has since become the word processor of choice for many Linux users. We've included it on the *Linux Answers* CD-ROM, and you can find it in the **/corel** folder.

Installing WordPerfect 8

WordPerfect doesn't come as an RPM package, which makes it slightly trickier than usual to install. There are two parts to the program – the core files, which you must install first, and various language modules, installed second. In this example, we'll install the main program and the UK English language module.

There are also language modules for French, Dutch, Italian and German on the CD (more are downloadable from **http://linux.corel.com/**).

Open a terminal window and create a temp directory in your home directory with the following command:

mkdir $HOME/tmp

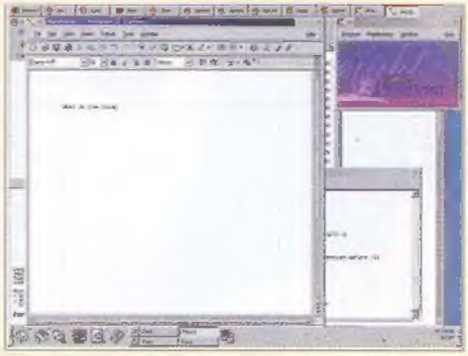
Now mount your CD-ROM and go to the **/corel** folder on the CD:

mount /mnt/cdrom
cd /mnt/cdrom/corel

Copy the main part of the program to your home directory, then move there with these commands:

cp guilg00.gz $HOME/tmp
cd $HOME/tmp

The files are compressed in a format similar to Windows ZIP files. Uncompress them with the following commands:



With WordPerfect, Corel has brought its world-class word processor to the Linux desktop. Woo hoo!

gunzip guilg00.gz
tar -xvf guilg00

Now run the installer:

./Runme

You'll be asked whether you've unzipped the files you've downloaded. Hit y for yes. After accepting the licence agreement, you'll be prompted for a directory to install it to. Type **/usr/local/corel** in the dialog box. Next you'll be asked for a 'Pattern Directory'. As you haven't installed WordPerfect before, leave the box blank and click **OK**.

Click **OK** to accept the defaults in the following windows, until you're prompted to select a printer. Find yours in the list, click on it, and then click **OK**.

To launch WordPerfect, you'll need to type the following command:

/usr/local/corel/wpbin/xwp

But that's a lot of work. If you're using KDE for your desktop, follow the directions in the KDE tips article on page 56 for adding Netscape to your desktop but create a shortcut to **/usr/local/corel/wpbin/xwp** instead of Netscape.

Once you're finished, you can delete all the files in your **tmp** directory with this command:

rm -f $HOME/tmp/*

Now we can install the UK Language Module, following the same basic steps:

cd /mnt/cdrom/corel
cp guilguk0.gz $HOME/tmp
cd $HOME/tmp
gunzip guilguk0.gz
tar -xvf guilguk0
./Runme

The prompts are almost exactly the same as in the original installation – be sure you specify the same directory to install to as you specified above: **/usr/local/corel**. Once you're done, open the KDE link you created on your desktop, and add the following to the Program section:

/usr/local/corel/wpbin/xwp -lang uk

Now WordPerfect will always use the UK Language module.

Note: this version of WordPerfect is free for personal use, but requires registration. If you do not register within 90 days, it will cease to work.

Software problems

Unfortunately, due to the complex nature of the software on this CD, we are unable to provide technical support. If you do have problems with the software, visit the **pcplus.linux** newsgroup. Alternatively, consult the extensive collection of HOW-TO files on the CD or visit **www.linuxcare.com**, which specialises in providing support for the Linux community.

Any comments?

Send your comments and suggestions for improvements to *Linux Answers*, Future Publishing, 30 Monmouth Street, Bath, BA1 2BW.

Defective CDs

In the unlikely event of your CD being physically damaged, we'll send you a new, working version within 28 days. Send your defective disc – complete with your name, address, and a description of the fault – to:

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Bluecrest, 272 Field End Road, Eastcote,
Ruislip HA4 9NA.

Au revoir...

Reader feedback

We need your help!

We're only a wee stripling of a magazine and if we're going to take root and grow into a mighty oak, we need some nourishment, which is where you can help. We need you to tell us what you like and dislike about the magazine. Have we got the balance right? Is there enough of the type of stuff you want to read about? Is there too much stuff you don't want to read about? Do let us know.

Either fill in the short coupon below and send it in, or fill in the form at **www.linuxanswers.co.uk**. Many thanks!

And what of the future?

We hope, if this issue does as well as we believe it will that we'll be back after Christmas in one form or another. So get those responses in. Tell us what you want from us in future, visit our Web site, get your mates to buy this issue and we'll be back! Thanks to all those members of the Linux community who helped put this mag together and hopefully we'll be back soon with more!

Please send your completed form to: **Linux Answers, Future Publishing, 30 Monmouth Street, Bath BA1 2BW.**

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Deputy Editor: Cathy Parnham
Senior Art Editor: Paul McIntyre
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Editorial contributors

Rob Fenwick, Chris Jones, Dave Coulson, Michael Hammel, Vince Veselosky, Frank Charlton, Alan Dexter, Steve Patient, Matt Kynaston, Mike Saunders, Paul Ferris

Art contributors/illustrators

Nell Roe, Jon Stuart, Stuart Harrison.

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Advertising

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Print Services Co-ordinator: Layla Vickers
Pre-Press Production: Jon Moore, Brian Hook, Mark Glover, Simon Chittendon, Paul Airs, Matthew Rogers, Paul Miners, Chris Stocker, Jason Titley, Jon Wakeham, Simon Windsor

Publishing/Circulation

CEO: Greg Ingham
Managing Director: Jane Ingham
Group Publisher: John Weir

Distribution

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Licensing Enquiries: Chris Power
e-mail: cpower@futurenet.co.uk
tel: +44 01225 442244
fax: +44 01225 732384

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What's with this penguin business then?

Tux the penguin is Linux's mascot and identifier. It was so chosen by Linus Torvalds after he was bitten by a penguin on a visit to a zoo. Find out more at **http://cvtc-cis.chippewa.tec.wi.us/~almquipf/linus-and-tux.html**

Open the Window and nothing's there: IT fable

Once upon a time there was an emperor who insisted that everyone should live in a fancy palace behind huge gates with a gaudy door and elaborate window.

Every time the emperor changed, everybody else had to change – especially the way they worked.

Then one day a penguin came along that didn't know how important the emperor was supposed to be. The penguin walked right through the big gates and entered the fancy palace but there was nothing inside. The penguin peeped behind the gaudy doors but all the cupboards were bare.

Just to make sure, the penguin peered through each elaborate window. But there was nothing worth looking at.

Moral; there's more to IT when you follow the penguin.

Alexis Developer Workstation

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